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Regional Geography

THE WORLD

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BY

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LONDON
ADAM AND CHARLES BLACK
1912

N.M.S. HIGH-H S.CO.DARY SCHOOL BANGALORE-1.
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PREFACE

THE first part of this book, which deals with Britain and the mainland of Europe, is written on rather simpler lines than the following sections on the remaining continents. The book is thus progressive in character, while in standard it is suited for the middle and upper forms of secondary schools, and for the preparation for such examinations as the Oxford Locals or Matriculation, or for a first year's course in a training college.

The method adopted in the description of each continent is regional, but revision chapters are inserted at the end of each continent in which the distributions of geographical phenomena over the whole area are summarized, and generalizations are formulated, which the students have been prepared by the preceding work to understand. Similarly, the consideration of the world-wide geographical distributions is deferred till the end of the book, but teachers can vary this arrangement if desired. Throughout the book stress has been laid on the main differences in structure, relief, and climate, which determine the regional divisions, and on the influence of these physical facts on the scenery of countries and the life of the inhabitants.

In order to facilitate the study of the relief and structure of the land and of climate, many simple diagrams have been introduced of a kind still too rare in ordinary school atlases. In constructing the maps illustrating relief, I must acknowledge the use I have been allowed to make of the orographical maps published by the Diagram Company. For the structural maps on pp. 253 and 293, I am indebted to Mr. J. W. Gregory, and for those on pp. 151 and 317, as well as for the maps illustrating the distribution of rainfall, to Professor Herbertson. To the lectures and writings of Mr. H. J. Mackinder and Professor Herbertson I also owe much concerning the application of the regional method adopted. I am further indebted for many of my facts and statistics to the 'Handbook of Commercial Geography,' by Mr. G. G. Chisholm, M.A., B.SC.; the 'Statesman's Year Books,' the 'Atlases of Commerce and Meteorology,' published by Bartholomew; and the 'Challenger' Reports. With regard to the simple sketch-maps inserted in the book, it may be well to explain that these are not intended to supplant the use of maps in an atlas, but in most cases to assist pupils in simple memory map-making.

The statistical tables appended are for purposes of reference, and it is hoped that those on climate will form the basis of many interesting geographical questions.

J. B. R.

CONTENTS

EUROPE :	PAGE
THE ATLANTIC OCEAN	1
CLIMATE	2
SCOTLAND	9
ENGLAND AND WALES	21
IRELAND	52
THE BRITISH ISLES : REVISION	60
FRANCE	70
ALPINELAND	78
GERMANY	81
HOLLAND	88
BELGIUM	90
DENMARK	91
SCANDINAVIA	93
RUSSIA	96
AUSTRIA-HUNGARY	102
THE NORTH BALKAN STATES	107
THE MEDITERRANEAN	108
THE IBERIAN PENINSULA	109
ITALY	113
SOUTH BALKAN STATES	119
EUROPE : REVISION	121
ASIA :	
ASIATIC RUSSIA	128
TURKEY IN ASIA	138
ARABIA	147
THE PLATEAUS OF CENTRAL ASIA	150
CHINA	157
THE JAPANESE ISLES	165
THE INDIAN EMPIRE	168
INDO-CHINA	178
THE MALAY PENINSULA AND EAST INDIES	181
ASIA : REVISION	183

NORTH AMERICA :	PAGE
THE DISCOVERY OF AMERICA	189
GREENLAND	192
BRITISH NORTH AMERICA	193
THE UNITED STATES	206
MEXICO AND CENTRAL AMERICA	220
THE WEST INDIES	223
NORTH AMERICA : REVISION	225
SOUTH AMERICA :	
CONFIGURATION	231
NORTHERN STATES	232
BRAZIL	234
ARGENTINA, PARAGUAY, AND URUGUAY	236
ANDEAN STATES	239
SOUTH AMERICA : REVISION	242
AFRICA :	
CONFIGURATION	244
THE ATLAS REGION	245
ISLANDS OFF THE NORTH-WEST COAST	248
THE SAHARA	249
EGYPT	254
THE EASTERN HORN	257
THE SUDAN	259
GUINEA	264
BELGIAN CONGO	268
EAST AFRICA	270
MADAGASCAR	275
SOUTH AFRICA	276
AFRICA : REVISION	285

AUSTRALIA : PAGE

SHAPE AND DISCOVERY - - 292
WESTERN AUSTRALIA - - 294
MIDDLE AUSTRALIA - - - 297
THE EASTERN HIGHLANDS - - 302
AUSTRALIA : REVISION - - 305

PACIFIC ISLANDS - - - - 308

NEW ZEALAND - - - - 310

THE WORLD :

THE EARTH - - - - 313
RELIEF AND STRUCTURE OF THE LAND - - - - - 315
THE OCEAN - - - - 316

THE WORLD (*continued*): PAGE

CLIMATE - - - - - 322
VEGETATION - - - - 325
FAUNA - - - - - 330
COAL AND METALS OF ECONOMIC VALUE - - - - - 333
POPULATION - - - - 334

STATISTICS

CLIMATIC - - - - - 338
AREA AND POPULATION OF CHIEF COUNTRIES - - - - 347

INDEX - - - - - - 351

LIST OF MAPS AND DIAGRAMS

	PAGE
EUROPE :	
ISOTHERMS, JANUARY	3
,, JULY	3
WINDS AND RAINFALL, NOVEMBER TO APRIL	4
WINDS AND RAINFALL, MAY TO OCTOBER	5
ANNUAL RAINFALL	7
POLITICAL	70
RELIEF	122
RIVER SYSTEM	125
DENSITY OF POPULATION	125
THE BRITISH ISLES :	
ISOTHERMS, JANUARY	8
,, JULY	8
WEATHER CHART	8
ANNUAL RAINFALL	8
OLD AND NEW ROCKS	15
RAILWAYS	19
RELIEF AND RAILWAYS	19
GREAT BRITAIN: WATERWAYS	51
THE BRITISH ISLES :	
DISTRIBUTION OF CATTLE	59
GEOLOGICAL	61
WHEAT-GROWING AREAS	65
DISTRIBUTION OF POPULATION	67
SCOTLAND :	
PHYSICAL AND POLITICAL	9
NATURAL REGIONS	11
NORTHERN ENGLAND :	
PHYSICAL AND POLITICAL	23
NATURAL REGIONS	23
THE LAKE DISTRICT	28
WALES : PHYSICAL AND POLITICAL	31
CENTRAL AND SOUTHERN ENGLAND : NATURAL REGIONS	35
THE MIDLANDS AND EASTERN ENGLAND : PHYSICAL AND POLITICAL	35
SECTION ACROSS ENGLAND AND WALES	40
EASTERN ENGLAND : GEOLOGICAL	41
SOUTH-EASTERN ENGLAND : PHYSICAL AND POLITICAL	35
SECTION ACROSS SOUTH-EASTERN ENGLAND	46
SOUTH-WESTERN ENGLAND : PHYSICAL AND POLITICAL	49
IRELAND :	
PHYSICAL AND POLITICAL	52
NATURAL REGIONS	53
PROVINCES	53
WATERWAYS	55
DIAGRAM OF BRITISH IMPORTS	69
FRANCE :	
POLITICAL	71
RELIEF AND RAILWAYS	72
NATURAL REGIONS	73
WATERWAYS	77
SWITZERLAND : POLITICAL AND ECONOMIC	80

GERMANY AND THE LOW COUNTRIES : PAGE
RELIEF - - - - - - 82
RHINELAND : POLITICAL - - - 83
GERMANY : POLITICAL - - - 85
GERMANY AND THE LOW COUNTRIES : RAILWAYS AND MINERAL DEPOSITS 87
HOLLAND AND BELGIUM : POLITICAL 89
SCANDINAVIA :
RELIEF AND RAILWAYS - - 92
POLITICAL - - - - 95
RUSSIA :
RELIEF AND RAILWAYS - - 97
VEGETATION - - - - 97
POLITICAL - - - - 99
DANUBELAND :
RELIEF - - - - - 103
NATURAL REGIONS - - - 103
RAILWAYS - - - - 106
AUSTRIA-HUNGARY : POLITICAL - - 104
THE IBERIAN PENINSULA :
POLITICAL - - - - 110
RELIEF AND RAILWAYS - - 111
NATURAL REGIONS - - - 111
ITALY :
POLITICAL - - - - 114
RELIEF - - - - - 117
RAILWAYS - - - - 117
BALKAN PENINSULA : POLITICAL - 120
ASIATIC RUSSIA : POLITICAL AND ECONOMIC - - - - - 129
SOUTH-WESTERN ASIA : POLITICAL AND ECONOMIC - - - - 139
TURKEY IN ASIA : POLITICAL AND ECONOMIC - - - - - 142
SOUTH-WESTERN ASIA : CLASSICAL - 145
THE FAR EAST : POLITICAL AND ECONOMIC - - - - - 159

INDIA : PAGE
PHYSICAL AND POLITICAL - - 169
GEOLOGICAL - - - - 171
ECONOMIC - - - - 175
BOMBAY, ENVIRONS OF - - 177
INDO-CHINA AND EAST INDIES :
POLITICAL AND ECONOMIC - - 179
ASIA :
ISOTHERMS, JANUARY - - 130
,, JULY - - - 131
RELIEF - - - - - 133
ANNUAL RAINFALL - - - 134
WINDS AND RAINFALL, NOVEMBER TO APRIL - - - - 136
WINDS AND RAINFALL, MAY TO OCTOBER - - - - 137
STRUCTURAL DIVISIONS - - 151
RIVER SYSTEM - - - - 183
POPULATION - - - - 187
NORTH AMERICA :
RELIEF - - - - - 191
ISOTHERMS, JANUARY - - 193
,, JULY - - - 193
SUMMER RAINFALL - - - 195
WINTER RAINFALL - - - 195
ANNUAL RAINFALL - - - 207
GEOLOGICAL - - - - 226
RIVER SYSTEM - - - - 227
ATLANTIC : ROUTE OF COLUMBUS - 191
BRITISH NORTH AMERICA : PHYSICAL AND POLITICAL - - - - 197
THE ST. LAWRENCE - - - 201
CANADA AND THE UNITED STATES : RAILWAYS - - - - - 205
DIAGRAM OF A CYCLONE - - - 207
EASTERN UNITED STATES : PHYSICAL AND POLITICAL - - - - 209
NEW YORK, ENVIRONS OF - - 210
CENTRAL AND WESTERN UNITED STATES : PHYSICAL AND POLITICAL - 213

	PAGE
THE UNITED STATES: DISTRIBUTION OF MINERALS	215
CENTRAL AMERICA AND THE WEST INDIES: POLITICAL	222
SOUTH AMERICA:	
ISOTHERMS, JANUARY	231
,, JULY	231
RIVER SYSTEM	233
RELIEF	233
PHYSICAL AND POLITICAL	237
SUMMER RAINFALL	241
WINTER RAINFALL	241
AFRICA:	
RELIEF	244
ISOTHERMS, JANUARY	248
,, JULY	249
WINDS AND RAINFALL, MAY TO OCTOBER	251
WINDS AND RAINFALL, NOVEMBER TO APRIL	251
RACES	291
RIVER SYSTEM	291
NORTH-WEST AFRICA: POLITICAL AND ECONOMIC	247
THE NILE	253
EAST AFRICA: STRUCTURAL DIVISIONS	253
THE SUEZ CANAL	257
WEST AFRICA: POLITICAL AND ECONOMIC	263
MIDDLE AFRICA: POLITICAL AND ECONOMIC	267
SOUTH AFRICA: POLITICAL AND ECONOMIC	276
DIAGRAM OF AN ARTESIAN WELL	286
AUSTRALIA:	
STRUCTURAL DIVISIONS	293
RELIEF	293
ISOTHERMS, JULY	295
,, JANUARY	295
WINDS AND RAINFALL, MAY TO OCTOBER	297
WINDS AND RAINFALL, NOVEMBER TO APRIL	297
POLITICAL AND ECONOMIC	300, 301
RIVER SYSTEM	305
NEW ZEALAND:	
POLITICAL	311
ECONOMIC	311
DIAGRAM OF THE SEASONS	314
SECTION OF A VOLCANO	316
DIAGRAM OF LAND AND SEA BREEZES	325
THE WORLD:	
STRUCTURAL DIVISIONS OF THE LAND AND OCEAN CURRENTS	317
ISOTHERMS, JANUARY	321
,, JULY	321
ISOBARS AND WIND, JANUARY	323
,, ,, ,, JULY	323
WIND SYSTEM	324
MEAN ANNUAL RAINFALL	327
NATURAL VEGETATION	329
ZOOLOGICAL PROVINCES	331
DISTRIBUTION OF POPULATION	335

RAI BAHADUR ARCOT MUDALIAR'S
HIGH SCHOOL,
BANGALORE.
ESTABLISHED
SEPTEMBER 1873.

EUROPE.

THE ATLANTIC OCEAN.

The Atlantic Ocean.—Europe is bounded on the west by the Atlantic Ocean, which extends to America. This ocean surrounds our islands. Part of it, called the English Channel, separates us from France; another part, called the North Sea, from Scandinavia; and a third branch, called the North Channel, Irish Sea, and St. George's Channel, separates Ireland from Great Britain. The ocean has also penetrated far into the mainland of Europe, forming the Baltic Sea, as well as the Bay of Biscay, and many inlets along the coast.

Tides.—The ocean is everywhere subject to the regular motion we call tides, due to the formation of gigantic swellings at intervals of about every twelve hours and twenty-five minutes, which travel eastwards as great tidal waves. Very far from the land the difference in the level of the sea, due to the passing of this wave, is slight, and the tides are not noticeable. Near the coast the changes in the level are very apparent, for they cause the sea to be always either gradually advancing over our shores or retreating from them. The extent to which the tide rises and falls varies at different places and different times, but is always greatest once every fortnight, about the time of full and new moons. The tides assist commerce by enabling large vessels to ascend to ports situated some way up rivers.

The Submarine Plateau of Britain.—Round our shores the tides are remarkably high on account of the submarine plateau from which the British Isles rise, and against the western edge of which the tidal wave gets piled up. This submarine plateau is under 100 fathoms, or 600 feet, in depth, but west of this the sea-floor suddenly slopes to a depth of 1,000 or more fathoms. The plateau unites Ireland to Great Britain, and Great Britain to the mainland, and recalls the time when the now shallow seas around us were dry land. Even to-day a slight

alteration in the depth of the sea would convert the famous fishing grounds called the Dogger Bank into an island, and abolish the Straits of Dover.

Advance of the Tidal Wave.—The tidal wave divides on reaching Ireland, and part turns northwards round Scotland, and part southwards through the English Channel. Very high tides occur in and near the Thames estuary on account of the union of two high tidal waves—one coming by the northern route in twenty-four hours, and one by the southern route in twelve hours. Still higher tides occur in the Severn estuary on account of its shape, and high tidal waves called 'bores' ascend the Severn, Trent, and a few other rivers at time of high tides.

The North Atlantic Drift.—The prevailing wind which blows over the North Atlantic Ocean and Western Europe comes from the south-west. This wind, in crossing the ocean, blows the warm waters from the south-west towards the coast of Norway, and creates the current known as the 'North Atlantic Drift.' This current keeps our ports and those of Western Norway free from ice in winter, even in the north. It does not, however, enter the Baltic, and hence the ports there are frozen in winter (see p. 317).

THE CLIMATE OF WESTERN EUROPE.

Under the word 'climate' we include questions of temperature, winds, and rainfall.

TEMPERATURE.

The Temperature of a place mainly depends on the following factors: (1) Latitude; (2) the season; (3) altitude; (4) winds.

How Latitude affects Temperature.—Latitude is distance north or south of the Equator. The farther one travels from the Equator, the cooler the climate becomes, mainly because the sun's rays become increasingly slanting, as the sun rises to a decreasing height above the horizon, and so they have less power. Slanting rays have also a thicker amount of atmosphere to pass through than direct rays, and thus lose more heat, as the atmosphere absorbs some heat in the passage of the rays to the earth.

The Seasons are due to the fact that the earth moves round the sun with its axis inclined $23\frac{1}{2}°$ from the vertical (see p. 314). When the North Pole points towards the sun it is summer for the Northern Hemisphere; for then the rays of the sun are less slanting, and the sun shines for a longer

Under 32. 32-50. Over 50. Temperature in degrees Fahrenheit.

EUROPE: MEAN ISOTHERMS FOR JANUARY. (After Hann.)

Under 50. 50-68. Over 68. Temperature in degrees Fahrenheit.

EUROPE: MEAN ISOTHERMS FOR JULY. (After Hann.)

EUROPE: WINDS AND RAIN, NOVEMBER TO APRIL.

time than in winter, when the North Pole points away from the sun, or than in spring and autumn. The difference between summer and winter increases with latitude. The winter days become shorter and shorter as we go towards the North Pole, till at places which lie on the Arctic Circle in latitude $66\frac{1}{2}°$ N. the sun never rises at all during one day; and still farther north there is an increasing period of continuous darkness. During the summer, on the other hand, the days become longer as one goes towards the north, and places on the Arctic Circle enjoy one night during which the sun never sets; while still farther north there is an increasing period of continuous daylight. The same holds true with regard to the South Polar regions in corresponding seasons.

Only a small part of Europe lies north of the Arctic Circle, in what is called the Frigid Zone. Most of it lies in the North Temperate Zone. Our own islands extend from latitude 50° to 60° N., if we include the Shetlands, a great enough distance to how clearly the influence of latitude on temperature, especially in summer (see p. 8).

How Altitude affects Temperature.—Temperature also varies with altitude, for there is less atmosphere over tracts of high ground than low, and thus the air over them absorbs less heat.

The heat, moreover, which passes through the air has generally only a relatively small amount of land surface to warm, and one from which it is quickly radiated off again. The air, in fact, receives most of its heat indirectly from the land, and not directly from the sun, so the upper layers of the atmosphere are always cold. In the maps showing temperature in this book the differences due to altitude are ignored, and the temperatures are calculated for sea-level; but since we know that temperature falls about 1° F. for 270 feet of ascent, when the ascent is steep and

the elevated area of small extent, it is possible to find out roughly what the difference amounts to when the height is known. The mountainous areas in Scandinavia and Central Europe have their temperatures so much reduced by altitude as to be largely buried in snow all the year round.

EUROPE: WINDS AND RAIN, MAY TO OCTOBER.

How Winds affect Temperature.—The prevailing wind over Europe is the south-west wind, and this is warm, because it comes from the south. Its effect, however, varies with the season, because it has crossed the Atlantic. In winter it is particularly warm, since water is always warmer than land in winter, because the sun's rays have penetrated farther down into it during the summer, and so it retains warmth longer. On the other hand, in the summer it takes longer than land to grow warm, and so is cooler at that season. Sea winds therefore tend to warm places in winter and cool them in summer. They make the temperature of a place at all seasons more alike, or, as we say, equable.

The great effect that the south-west winds have in warming Western Europe in winter is clearly shown on p. 3. They cause the isotherms—or lines drawn through places which have the same temperature for the same period—to run nearly north and south, instead of east and west, as we should expect from the influence of latitude. The moderating influence of the south-west winds naturally decreases towards the east, as they pass over land, and thus the temperature of Western Britain is more equable than Eastern (see p. 8). Eastern Britain is also more exposed to east winds, which have mainly come over land. These are commonest in spring, when they are especially cold, as Northern Europe is still very cold then. A climate which is rendered equable by prevailing sea winds is sometimes called "insular," and one subject to extremes from being chiefly influenced by land winds "continental."

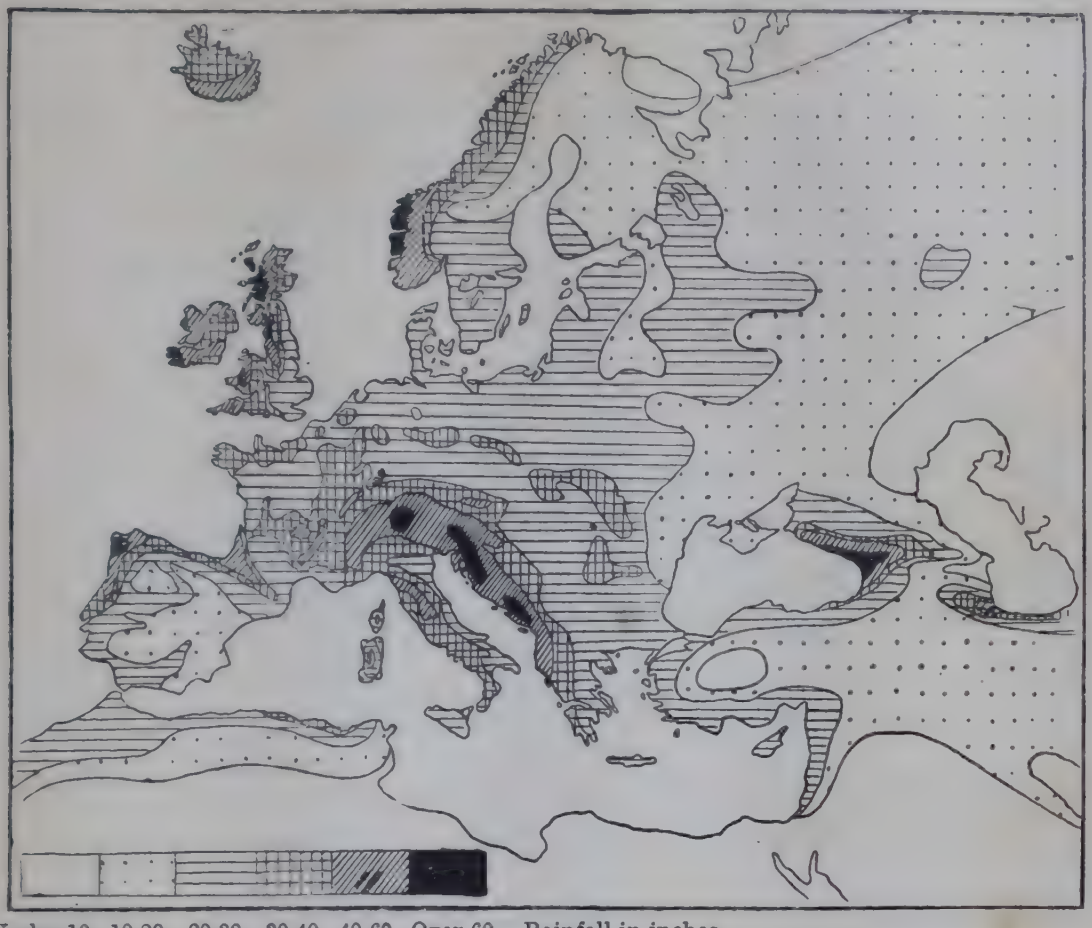
RAINFALL.

Rainfall.—The amount of rain that a place experiences depends mainly on the degree of its exposure to moisture-laden winds, and its position with regard to mountains. The south-westerly winds, as they pass over the Atlantic, become laden with moisture. This moisture, carried in the form of vapour, is changed into rain whenever the winds are sufficiently chilled ; and as they are travelling to cooler regions than they have left, there is always the tendency for them to bring rain.

How Mountains affect Rainfall.—When winds have to surmount ranges which lie across their paths they lose heat rapidly, both because the very act of rising is a cooling process, and because they are forced into the cool upper atmosphere. The south-west winds are thus chilled on having to rise in front of the ranges of Western Britain or Scandinavia, and this produces a heavy rainfall in these districts (see p. 7). A range causes a wind to begin to rise some distance in front of it, just as a dam raises the level of a river some distance above it ; and so the rainfall is often heavy, not only on the slopes of a range exposed to sea winds, but over the country crossed by the wind before it reaches the range. On the other hand, the country on the other side of the mountains will be much drier, for the wind must give up most of its moisture in crossing the range. The rainfall of Eastern England is thus reduced by the Pennines and Welsh mountains.

The Seasonal Distribution of Rainfall.—As the south-west wind blows frequently at all seasons over Europe, north of the Mediterranean region, the rainfall is well distributed throughout the year. The western coastal regions, however, often experience the heaviest falls in the autumn and winter, when storms of a cyclonic nature are fairly frequent.

Cyclones.—These storms are due to winds blowing spirally inwards to areas in which the pressure of the atmosphere decreases towards the centre. These areas of atmospheric depression often cross the Atlantic and our islands in the track of the south-west wind. The inblowing winds are so much deflected to the right of their path of motion, from the influence of the rotation of the earth, that they will usually only cross the isobars—or lines drawn through places having the same pressure at the same time—at a slight angle (see pp. 8, 207). As the air rushes into the area of low pressure, it expands, and therefore cools, so that rain is



EUROPE: MEAN ANNUAL RAINFALL. (After various authorities.)

likely to fall. In fact, whenever the barometer falls, and thus indicates a decrease of pressure, we consider it a sign that rain is likely to fall. In time an area of depression will vanish, and may be supplanted by an area of high pressure from which winds blow outwards and will probably be dry. Such a system is called anticyclonic.

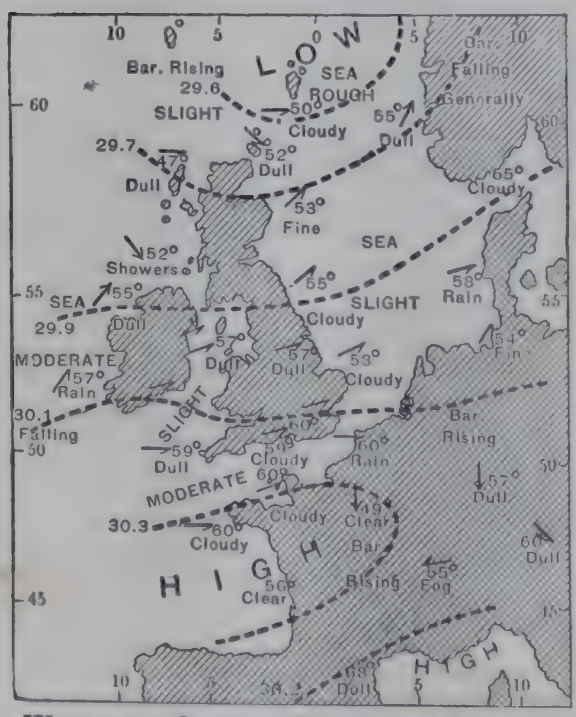
The rainfall of inland districts of Western Europe is generally heaviest in summer, for evaporation is most rapid then, and there is a tendency at that season for hot air to rise over the land, and for sea winds to blow far inland and take its place.

Climate of Western Europe.—From the above we see that, though the climate of different parts of Western Europe varies considerably, we can describe the whole region broadly as being temperate, equable, exposed to prevailing south-westerly winds, and liable to a fair rainfall at all seasons.

(For climatic statistics of European places, see pp. 338, 339, 340.)

THE BRITISH ISLES: ISOTHERMS FOR JANUARY. (After Buchan.)

THE BRITISH ISLES: ISOTHERMS FOR JULY. (After Buchan.)



WEATHER CHART, TUESDAY, SEPTEMBER 8, 8 A.M., 1903.

ANNUAL RAINFALL OF THE BRITISH ISLES.

This chart is reproduced by kind permission from the *Times*. The amounts of barometric pressure are stated at the end of the isobars; the other figures indicate temperature or latitude and longitude.

Scotland: Physical and Political.

THE BRITISH ISLES.

SCOTLAND.

The regions into which Scotland naturally falls are the Highlands, the Lowland Plain, and the Southern Uplands (see p. 11).

THE HIGHLANDS.

This region extends southwards to a line connecting the mouth of the Clyde and Stonehaven where a sudden change of rock occurs (see p. 61). It was once a plateau, and its front edge, as seen from the Lowlands, has still a very wall-like appearance. The surface, however, is now very uneven ; for though a good deal of the land is of much the same height, there are many mountain peaks which rise above the general level, and there are very deep valleys called ' glens.'

Glenmore, which is, as its name means, ' a great glen,' divides the Highlands into two parts. Very long ago an earth movement cracked the rocks along this line, and water has been at work since then enlarging the crack, till it has become a long, narrow valley. There are three lakes at the bottom of this glen, the largest of which is called Loch Ness. From this loch the River Ness flows to Moray Firth. A canal has been cut connecting the rivers and lakes at the bottom of Glenmore, so that vessels can go from Loch Linnhe to Moray Firth without going round Scotland. It is called the Caledonian Canal.

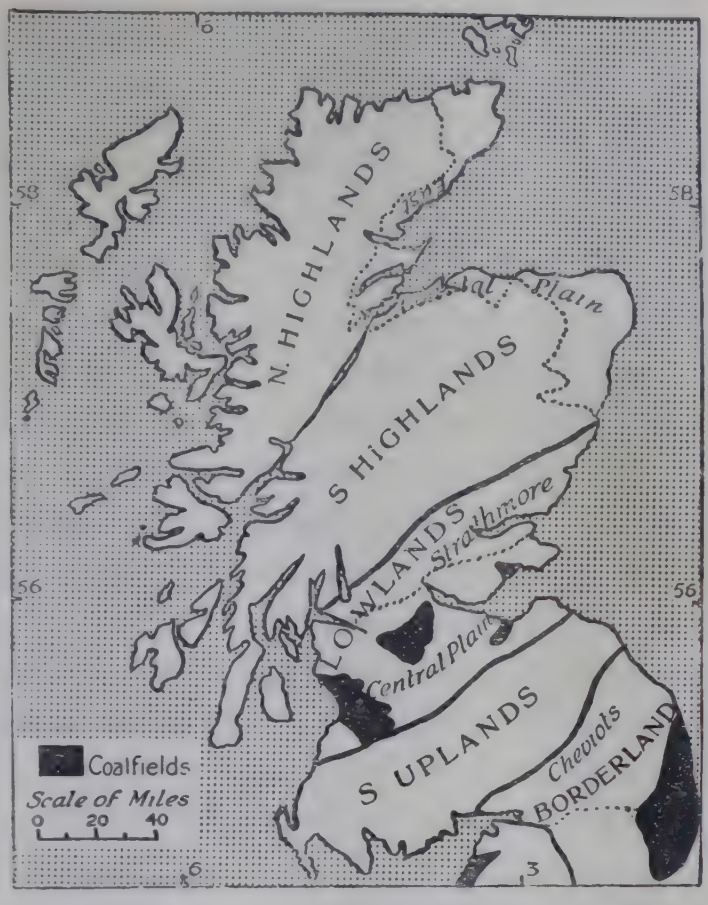
The Northern Highlands.—In this area the highest ridges of land stretch from north to south, but lie rather nearer the east than the west coast. They form the water-parting of the north, and from their position the rivers flowing westward are shorter and more rapid than those flowing east. Many of the rivers flow through long, narrow lochs, two of the largest lakes being Loch Shin and Loch Maree.

The West Coast is high and rocky, and broken by the long deep inlets which form the mouths of the western rivers. Many of the inlets are winding, so that, from some points of view, they seem as if they were enclosed by land, like lakes, and are, in fact, called lochs, like the river-lakes. These inlets were formed by an earth movement very long ago, which slightly, and probably very gradually, tilted the land, so that the west coast was lowered. Then the sea came in and flooded the lower valleys of the rivers.

The East Coast is more regular, but is broken by a few large estuaries, called " firths." These have been formed chiefly by the action of the sea, which has gradually worn away the land.

The Southern Highlands.—South of Glenmore the general direction of the mountain ranges is from south-west to north-east, and they are sometimes called the Grampians. The highest peak in the United

Kingdom is Ben Nevis, which rises in the west to a height of over 4,000 feet—that is, over three-quarters of a mile. Many long rivers rise in the Southern Highlands, and of these the Spey flows north-eastward, the Don and the Dee eastward, while the Tay and Forth flow south-eastward. Only short rivers flow toward the west, or descend by falls into Glenmore. Some of these falls are now used to make electricity for working machinery.



SCOTLAND: NATURAL REGIONS.

Climate of the Highlands.—The climate is very cold in winter on account of the northerly latitude and the height of the land. In summer it is warm, though naturally cooler than regions farther south or lower in height. The region receives a good deal of rain from the prevailing south-west winds—especially in the west.

Rock Structure and Scenery.—The Highlands are mainly composed of rocks, which were formed very long ago, and which have in the course of ages assumed a hard, crystalline nature. Granite also occurs in places, and caps many of the higher mountains. These rocks yield but a poor thin soil, and much of this has been washed down by rain and rivers to the lower valleys and plains. Large areas of the Highlands are therefore moors covered with heather, bracken, loose stones, and bogs. The bogs are composed of decayed matted masses of moss, grass, and other plants, mixed with mud and water. Peat, which is the common fuel in the Highlands, is obtained from the bog by cutting out cakes of it, which are stacked in piles to dry.

Deer-Forests.—Very long ago part of the Highlands was covered with woods, but now trees are rarely seen outside the valleys. The so-

called 'deer-forests' are, in fact, merely wide expanses of moor, where the deer still run wild. They owe their charm to the bracing air and changing effects of mist and sunshine, to the unbroken miles of purple heather in summer, and to the mountain torrents dyed brown by peat, but marked with white foam where they tumble over the rocks in their course. Many tourists visit these moors in summer, and some have been bought by rich men who wish to preserve the deer and various kinds of game for shooting.

Valleys and Lakes.—In the valleys the commonest trees are silver birches, but there are also Scotch firs and oak-trees, and many lovely flowers, ferns, and mosses grow along the river-sides. One district, which is especially noted for its beautiful combination of grand mountain scenery with that of a lovely valley, is called the **Trossachs.** This district lies around a tributary of the Forth, which flows through Loch Katrine, and is yearly visited by many tourists. Other and larger lakes which are also very picturesque are Loch Lomond, which lies on the southern margin of the Highlands and is drained to the Clyde; Loch Tay, which is drained by the Tay; and Loch Awe.

Inhabitants.—Few people can earn a livelihood on the moors, and so most of the inhabitants of the Highlands live in the valleys. Communication is difficult between these valleys on account of the high moors between them, and so in the past the inhabitants of each valley often formed a group, or 'clan,' with certain distinctive peculiarities of dress and customs. Few, however, now wear the Highland costume, but some still speak Gaelic, the language of the Celtic race from which they are descended. Most of the Highland peasants live in scattered cottages built of stone and thatched with heather, bracken, or straw. They cultivate small patches of oats and potatoes, and look after herds of sheep. Dogs have been trained to be of great use in collecting their flocks. Ponies are also reared, and the wild-looking breed of Highland cattle, with long horns and shaggy coats. Salmon and trout are caught in most of the rivers, and the sea-fisheries are very important. Villages are few and far between, and the little towns are tourist centres or ports.

The Highland Railway has been constructed through the heart of the Southern Highlands. It goes from Perth up the valley of the Tay and through the gorge of Killiecrankie, in the valley of a tributary of the Tay called the Garry. Then it crosses the Drumochter Pass and descends the valley of the Spey till it bends westward to Inverness.

THE WESTERN ISLANDS AND SHORES OF THE MAINLAND.

The Outer Hebrides consist of the large island of Lewis in the north, Harris in the south, and several small islands. Most of the land is low, and the surface consists of bare grey rock, bog, moor, and numerous little lakes. The population is sparse and poor. The peasants rear sheep, and weave the wool thus obtained into tweed on small looms in their cottages. Fishing is also an important occupation, for the islands act as a sort of breakwater, and large numbers of herring are caught in the sheltered waters of the Minch. The chief fishing season is early in the year. **Stornoway**, on the east coast of Lewis, is an important centre of the industry.

The Inner Hebrides.—The largest islands are Skye, Mull, Jura, and Islay. Here, too, fishing is everywhere important. **Portree,** in Skye, is the chief station for it. A large part of Skye and Mull and some of the smaller isles are covered with a thick layer of a rock called ' basalt.' This rock is of volcanic origin, and must have very long ago flowed over the older rocks like lava. It probably issued from a great crack in the earth's crust, extending from the North of Skye to Lough Neagh, in North Ireland, for though the sea has in the course of ages destroyed most of the land formed by this lava, there are still patches left in North-East Ireland, and on the islands which lie in this belt.

The rock in cooling assumed in some places the appearance of columns—a structure particularly well shown in **Staffa** and in the Giant's Causeway, in North Ireland. The sea has eroded several caves in Staffa, and one very large one, which is known as Fingal's Cave. Here the walls are a continuous colonnade of natural pillars, each having generally six clear-cut sides. South of Staffa is the small island of **Iona,** famous for the ruins of a beautiful cathedral, where many of the Scottish Kings were buried. It was built on the site of a monastery founded by St. Columba in the sixth century.

The West Coast.—The chief places lie in the County of Argyll—*i.e.*, **Inverary,** the capital ; **Campbeltown,** noted for its distilleries ; and Oban. **Oban** is a great centre for tourist traffic, since it is a railway terminus, and steamers go regularly from it through the Caledonian Canal to Inverness, as well as to Skye, Staffa, Iona, and Glasgow. The distance between it and Glasgow has been shortened by cutting the Crinan Canal across the Kintyre Peninsula.

THE NORTHERN ISLANDS.

The Shetland Islands consist of crystalline rocks like the Highlands. The inhabitants rear a breed of sheep noted for their soft wool, and also a breed of small ponies. Many earn a livelihood by fishing, for which **Lerwick** is the centre.

The Orkneys consist of old red sandstone, like Caithness, from which they are separated by the Pentland Firth. The current of water through this channel is so strong that navigation is sometimes dangerous. Most of the islands are low, but one, called **Hoy,** has precipitous cliffs. **Kirkwall,** the capital, possesses a fine ruined cathedral, and is also a fishing station.

THE EAST COAST PLAIN.

The part of the plain which stretches over Caithness and round the shores of Moray Firth to the Spey consists of fertile red sandstone, on which good crops of turnips and potatoes are grown. The red sandstone forms fine cliffs at Duncansby Head, and is quarried at **Thurso,** as it makes excellent flagstones. East of the Spey the plain consists of crystalline rocks and granite.

A railway traverses this plain—which is the most densely populated part of North Scotland—and links together the chief towns of the northern counties. From Aberdeen it skirts the mountains, and thus cuts off the Buchan Peninsula, but there are branches to the fishing ports of **Peterhead** and **Banff.** Then it passes through **Elgin, Nairn,** and **Inverness,** the capitals of the counties of those names, and turns northwards through **Dingwall,** capital of Ross and Cromarty, to **Wick,** capital of Caithness. **Inverness** stands, as its name shows, at the mouth of the River Ness. It is sometimes called the capital of the Highlands, and it occupies a fine situation commanding the Caledonian Canal, and the routes northwards and westwards followed by the railway. Its chief exports are sheep and wool from the Highlands.

Aberdeen, like Inverness, is named from its situation, for the word means 'at the mouth of the Dee.' Like Inverness, too, it has the advantage of being the meeting-place of many routes, for besides standing on the coast railway, one line runs from it up the lonely valley of the Dee to Balmoral, where the King has a castle, and another goes some way up the valley of the Don. Most of the houses in Aberdeen,

as well as its fine University, are built of grey granite. This is quarried in the district, and there are large works for polishing the granite at Aberdeen before it is exported. The city also exports a large number of cattle, which are brought down from the Highlands and fattened on the plain. Some of the cattle are killed and there are several factories for preserving meat, tanning skins, and making combs from horns. Many fishing fleets are sent out yearly from Aberdeen, and some of the fish caught is preserved by curing before it is exported. Another industry is shipbuilding.

Peterhead, further north, exports the red granite which occurs in that neighbourhood, and carries on an important fishing trade. Fishing is also the chief industry at **Stonehaven,** the capital of Kincardine.

THE BRITISH ISLES: OLD AND NEW ROCKS. (See pp. 60, 61.)

Black, Pre-Permian; white, Post-Carboniferous.

THE LOWLANDS.

STRATHMORE.

South of the Highlands there stretches across Scotland a diagonal belt of old red sandstone, forming that part of the Lowlands which is called Strathmore—*i.e.*, the Great valley. This fertile valley is bounded on the south by the hills in the north of Renfrew, the Campsie Fells, the Ochill Hills, and the Sidlaw Hills. The gaps between these ranges, which are followed by the rivers Clyde, Forth, and Tay, formed natural routes, which were guarded in former times by castles at Dumbarton, Stirling, and Perth.

Stirling stands beside the River Forth, where it is bridged, in the gap between the Campsie Fells and Ochill Hills. Steamers can ascend the Forth to Stirling, but the voyage is long compared with the direct distance, for the Forth has many windings, called 'links.' The castle of Stirling was built on the top of an isolated hill which is the remains

of an old volcano. Though there are no volcanoes in this district now, they must once have been numerous, for the whole belt of hills which bounds Strathmore on the south is composed of basalt, like Mull and Skye. The narrowness of Scotland between the Firths of Clyde and Tay increases the importance of the route following the Forth to the Highlands, and many battles have taken place at and near Stirling—*e.g.*, Bannockburn.

Perth is situated on the Tay, at the head of navigation for small vessels, and where the river is bridged. It stands in the gap between the Ochill Hills and Sidlaw Hills, and is an important trade centre and railway junction. Routes lead from it to the Highlands by the Tay valley, to Aberdeen and Stirling along Strathmore, to Dundee by the coast, and to Edinburgh by way of Fife and the Forth Bridge. It was once practically the capital of the country, and the Kings were crowned near by at Scone. In recent times the dyeing industry has been carried on very successfully at Perth, on account of the purity of the water. The town is the capital of the county of Perth, which falls naturally into two parts—the Highland north-west and fertile Lowland south-east. The former is much visited by tourists and sportsmen in the summer and autumn.

Dundee.—This town is situated in Forfar, on the north bank of the Firth of Tay. It stands in the midst of the fertile strip of land between the Sidlaw Hills and Firth of Tay which is called the Carse of Gowrie. This district is sheltered from cold winds, and much fruit is grown there. This has given rise to a jam industry at Dundee, to which has been added that of marmalade, though the oranges have, of course, to be imported. Dundee is also noted for the manufacture of carpets and sacking made of jute from India, of ropes made of hemp from Russia, and of sackcloth and coarse linen made of flax which is mainly imported from Russia and Belgium. Coal, too, has to be imported for these industries. Dundee is therefore a very busy port, and has grown to be the third largest town in Scotland. It receives traffic by the coastal railway, and from the south by the line which crosses the Firth of Tay by a bridge over two miles long. Shipbuilding is carried on at the port, and steamers go regularly to the whale and seal fisheries of the North.

The towns of **Arbroath** and **Montrose**, which stand on the coast of Forfar further north, have linen industries like Dundee, and are also fishing stations.

THE CENTRAL PLAIN.

Mineral Wealth.—The Central Plain lies between the belt of hills which bounds Strathmore and the Southern Uplands. The chief rock which forms this plain is carboniferous limestone, and the area is rich in coal and iron. The coal-fields are shown on p. 11, and iron is obtained in large quantities from the two western fields. As limestone facilitates the process of smelting ore, it is very convenient when coal, iron, and limestone are found near together as here. There are very large smelting and iron works at and round **Coatbridge,** in Lanark, and **Falkirk,** in Stirling. Oil shale, from which paraffin is distilled, is quarried near the Edinburgh coal-field.

The natural fertility of the plain, as well as the many industries which have arisen on account of the coal and iron found there, have made it the most densely populated part of Scotland. The level nature of the ground has made it easy to construct many railways across it, and it has excellent waterways in the lower portions of the Clyde and Forth, and the canal which connects them (see p. 51).

The Basin of the Clyde.—The Clyde rises in the Southern Uplands, from which it descends by picturesque falls near Lanark. It then proceeds through a fertile valley, noted for its orchards and the fine horses which are bred there, and enters the busy coal-mining and manufacturing district of which Glasgow is the centre. Below Glasgow the river is navigable for ocean vessels, and its banks are lined with shipbuilding yards. After passing Greenock the estuary of the river turns southward, and enters the Firth of Clyde. In this firth lie the picturesque islands of Arran and Bute. Bute is separated from the mainland by straits called ‘ kyles,’ and **Rothesay** is a noted watering-place on the island.

Glasgow stands on the Clyde, at the lowest point at which it could be bridged in early days, and where it is now crossed by many bridges, including three for railways. It has, however, only risen to great importance since the steel shipbuilding industry was established there, and since the Clyde was deepened so that ocean vessels could reach the city. To its shipbuilding it has added the manufacture of engines for steamers and trains, and other kinds of machinery. It has also potteries, chemical works, breweries, and large factories for manufacturing cotton and woollen goods. The city has a cathedral, and a University has

been established there. Glasgow has, in fact, grown to be the largest town in Scotland, and next to London the largest in the Kingdom.

Many other towns on and near the western coal-fields are noted as manufacturing centres or ports. **Paisley,** to the west of Glasgow, is famous for its cotton-thread industry, and **Kilmarnock,** to the south, for iron goods and carpets. **Greenock** is noted for sugar-refining, as well as for shipbuilding. The sugar industry grew up when most of our sugar was procured from canes grown in the West Indies, but now it is chiefly obtained from a kind of beetroot. **Ayr** and **Ardrossan** are small manufacturing towns and ports, which form outlets for the Ayrshire coal-field.

Fife.—This county lies between the Firths of Tay and Forth. and ends in the promontory of Fife Ness. The coal-field of the south has aided the linen industry at **Dunfermline** and the manufacture of linoleum at **Kirkcaldy. Cupar,** the county town, is an agricultural centre, while **St. Andrews** is noted for its University and golf links.

Edinburgh, the capital of Scotland, grew up on the hilly ground in the gap between the Pentland Hills and the sea. The castle, now only used as barracks, was built, like that at Stirling, on the remnant of an old volcano; and at the foot of another volcanic stump called 'Arthur's Seat' stands Holyrood Palace. Edinburgh manufactures paper, and has large breweries, both industries benefiting by the suitability of the local water-supply. Book-printing is also carried on, and the city possesses a University renowned for its medical school. **Leith** is the port of Edinburgh, and also a fishing station.

Railways.—Edinburgh is a great railway centre. From it railways belonging to the North British Company diverge (1) to Berwick, along the east coast through Dunbar; (2) to Carlisle through Galashiels; (3) to Dundee, over the Forth Bridge, which is $1\frac{1}{2}$ miles long, and then across Fife and the Tay Bridge; (4) to Glasgow. The Caledonian Railway also reaches it from Carlisle through Carstairs, and is continued northwards to Aberdeen through Stirling, Perth, and Forfar (see p. 19).

THE SOUTHERN UPLANDS.

These gently rounded hills occupy most of Southern Scotland, and consist chiefly of slate and shale. Near the centre the Clyde, Tweed, and Annan all rise in the Lowther Hills. The Annan and Clyde valleys are utilized by the Caledonian Railway from Carlisle to Glasgow, which has a branch from Carstairs to Edinburgh.

THE BRITISH ISLES: RAILWAYS.

THE BRITISH ISLES: RELIEF AND RAILWAYS.

Scenery.—The Uplands are covered mainly with short heather, bracken, and coarse grass, on which large numbers of sheep are reared. In some parts there are bogs and barren tracts, and trees are rare, except in the river-valleys, where the mountain-ash, birch, and various bushes harbour numerous singing-birds. The poet Burns often wrote about the beauties of the 'bonnie banks' of the streams in this region, which he knew well, as he was born near Ayr. Geikie describes the general character of the Uplands as follows: "From the sky-line on either side, gently but boldly drawn curves of bent-covered moorland sweep down in grassy meadow on the floor of the valley. These are the architectural forms of the hill slopes, and remain distinct at all seasons of the year. But their beauty and impressiveness vary from month to month, almost from hour to hour. For the most part they are aglow with colour, now purple with heath blooms, now bright-green with bracken, now yellow with golden bent, now deepening into orange and russet as the early frosts of autumn lay their fingers on the ferns."

The Tweed flows through a broad fertile valley, and is fed by the Ettrick, Teviot, and other tributaries noted for their beauty. The district has a further interest on account of the picturesque abbeys of **Melrose** and **Jedburgh,** and its associations with Sir Walter Scott, who dwelt at Abbotsford, on the Tweed, near its confluence with the Gala. The Tweed basin has become the seat of an important woollen industry, which arose here on account of the number of sheep reared on the Uplands, and the supply of pure water for washing the wool. Coal has, however, to be imported. The chief manufacturing towns are **Galashiels,** on the Gala, and **Hawick,** on the Teviot, both being on the North British line from Carlisle to Edinburgh.

The South Coastal Plain is very fertile, and is noted, like that round Ayr, for cattle and dairy produce. Important cattle fairs are held at **Dumfries,** which stands at the head of navigation on the Nith. The town also manufactures tweeds, and is a railway junction. One line goes from it up the Nith valley and on through Kilmarnock to Glasgow, and another, which follows all along the south coast, crosses the Nith by a bridge at this point. This coast-line leads westwards to **Stranraer,** a port from which steamers go regularly to Larne, in Ireland, and eastwards to Carlisle, through the gap between the Cheviots and the head of Solway Firth. The population of South Scotland is very sparse, save along this coastal plain and in the Tweed valley.

ENGLAND AND WALES.

NATURAL REGIONS.

The country can be broadly divided into the following areas : (1) Northern England ; (2) Wales ; (3) the Midland Plain ; (4) Eastern England ; (5) South-Eastern England ; (6) South-Western England. The subdivisions of these areas into natural regions is shown on the maps on pp. 23 and 35.

NORTHERN ENGLAND.

THE BORDERLAND.

This is the name given to the tract of land between England and Scotland, and the greater part of it is filled by the Cheviots. The political dividing-line between England and Scotland runs north of the Tweed, near the east coast, but afterwards follows that river and then the Cheviot Hills, till it reaches and crosses the level land at the head of Solway Firth.

The Cheviots are rounded, grassy hills, well suited for sheep-rearing. They form a fairly good natural boundary, for they are sparsely populated, and not very easily crossed save by one or two passes. They have, in fact, obliged the great routes between England and Scotland to be made through the gaps which lie between them and the sea at their western and eastern ends. The routes leading through these gaps and that across the Cheviots by the pass of Carter Bar have naturally been the scene of many battles in the past. One of the most famous took place at Flodden, on the route which follows the Till tributary of the Tweed ; and **Berwick,** which guards the eastern gap and stands at the mouth of the Tweed, has only been continuously in English hands since 1482. It was probably the constant danger from war in this district that caused the early Christian missionaries to select Holy Isle as a centre for work, and erect on it the Abbey of Lindisfarne.

Carlisle guarded the western gap, though the bog called Solway Moss, before it was drained, acted as a partial protection from invasion by this route. The town, which stands on the Eden, was early fortified by a castle, which is now in ruins, and it also possesses a cathedral. It is the capital of Cumberland, and a great railway centre, from which the North British and Caledonian lines lead into Scotland, the Midland and

North-Western to London, and a branch of the North-Eastern to Newcastle.

The last-mentioned railway follows the deep depression between the Cheviots and the Pennines which consists of the valleys of the Irthing tributary of the Eden and the South Tyne. The Romans built a wall just north of this depression, called 'Hadrian's Wall,' which marked the northern limit of their territory for many years.

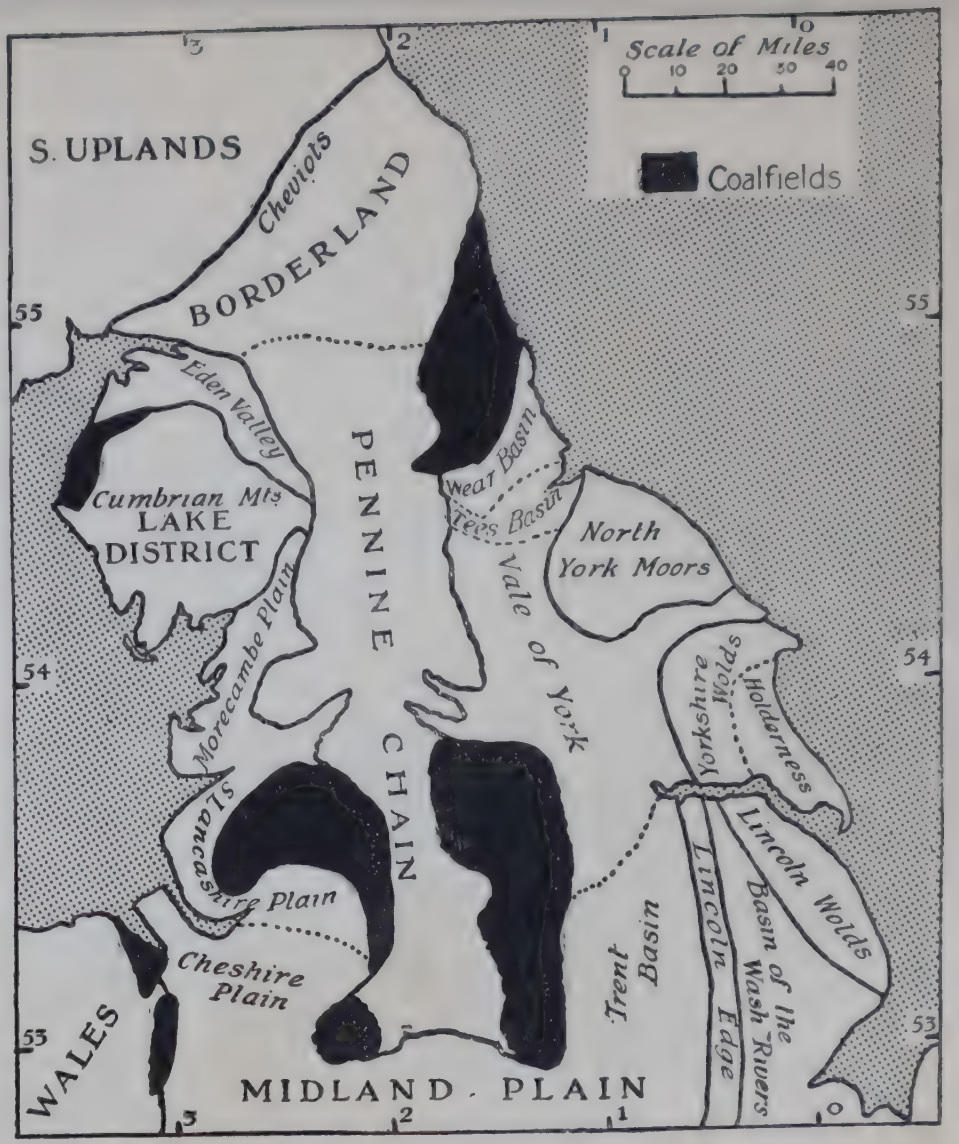
THE PENNINES.

This belt of mountainous moorland forms the backbone and watershed of Northern England. It is connected with the Cumbrian group by a ridge of land 1,000 feet high, called Shap Fell, and separated from it by the Lune, which flows south, and the Eden, which flows north. The range extends southwards till it ends in the picturesque Peak District of Derbyshire. Some of the peaks in the range are over 2,000 feet high —*e.g.*, Cross Fell (2,900), Whernside, and Ingleborough—and the average height is such that it affects the climate of North England. The prevailing westerly winds are forced to rise in front of the range, and thus bring heavy rains to the western slopes and plains still farther west, while they afterwards pass on to the eastern district as much drier winds. Parts of the Pennines are utilized as sheep pastures, but agriculture is confined to the fertile river-valleys which furrow it, and where the inhabitants mainly dwell.

Cross Routes.—The height of the range and its great breadth—over 40 miles in one place—caused it to be a great barrier to communication in former times. It is, however, nearly severed by the depression called the Aire Gap, between the valleys of the Aire and Ribble, which is under 500 feet high. This gap is utilized by the Midland Railway between Leeds and Carlisle, and by the Leeds and Liverpool Canal, which has a branch to Preston. Two other canals, which connect the Calder tributary of the Ouse to the Irwell tributary of the Mersey, also cross the Pennines. One of these passes through Halifax, and the most southern through Huddersfield, and then through a tunnel about 3 miles long. On all these canals many locks are required (see p. 51). Railways also now cross the Pennines by these routes, as well as at several other places.

Rock Structure.—The Pennines were formed long ago by an upfold of carboniferous rocks, but the coal which was then all over the

NORTHERN ENGLAND: PHYSICAL AND POLITICAL.



NORTHERN ENGLAND: NATURAL REGIONS.

top, has been worn away, till now it is only found on the flanks—*i.e.*, the coal-fields of Northumberland, Durham, Yorkshire, and Lancashire. Underneath this was a layer of millstone grit, which, though much worn away in places, still caps the higher peaks, and is largely found in the middle of the range. Below this, and now often at the surface, is grey carboniferous limestone.

Scenery.—The brownish millstone grit forms plateaus of heathery moorland, over which are scattered huge stones, while the basin-like valleys have steep, rocky upper slopes, but gently curving grassy floors. The plateaus of light-grey limestone are generally covered with grass, intersected by stone walls, and diversified by a few wind-blown clumps of trees. The valleys are deep, narrow ravines, decked with a rich and varied vegetation wherever water occurs. The streams, however, often disappear into the ground through cracks in the limestone, called 'swallow-holes,' and, by solution, form subterranean chambers and vast caves.

The Peak District in Derbyshire is particularly famous for the size and beauty of the caverns around Castleton. The caves of the Blue John Mine are adorned with stalactites, which look like icicles of semi-transparent rock hanging from the roof. Water, in passing through the rock, has dissolved a great deal of lime, and when it is suspended as a drop from the roof of a cave, it evaporates, and the lime is deposited. Other drops trickle over the same spot, and so in time the deposit increases, whilst stalagmites are similarly formed where the drops fall on the floor of the cave. Medicinal springs, combined with fine scenery, have rendered **Matlock** and **Buxton** favourite resorts.

THE NORTHUMBERLAND AND DURHAM COAL-FIELD AND THE BASINS OF THE WEAR AND TEES.

Shipbuilding Ports and Iron Manufacturing Towns.—This coal-field is associated with the iron industry, and particularly with shipbuilding. The iron ore is brought from the rich iron-mines of Cleveland, in North Yorkshire, and the limestone, which facilitates the process of smelting, is close at hand. The chief towns engaged in shipbuilding are ports along the lower course of the Tyne—**Newcastle, Gateshead, Jarrow, North and South Shields,** and **Tynemouth**; **Sunderland** on the Wear, **Middlesbrough** on the Tees, and the **Hartlepools.** The towns on the Tees—*e.g.*, **Dar-**

lington, Stockton, and **Middlesbrough**—are also engaged in the iron industry. Darlington specializes in locomotives.

Newcastle, the capital of Northumberland, is named after the Norman castle erected near the place where the Romans previously had bridged the Tyne. It thus stands on the important route to Scotland, now followed by the North-Eastern Railway. A great deal of coal is exported from Newcastle, as well as used locally in shipbuilding and other industries. The manufacture of glass and chemicals in the town has been stimulated by the salt found in the locality.

Durham stands in the midst of a fertile area, and is built where a tongue of land, nearly surrounded by a loop of the Wear, formed a good site for a castle in early days. It has also a beautiful cathedral and a University, and is the county town of Durham.

YORKSHIRE.

Natural Regions.—Yorkshire is divided for political purposes into the North, West, and East Ridings, but on account of its relief it can be also divided into the following areas: A western belt composed of the western Pennine slopes, the central vale crossed by the Ouse, the North Moors, the Wolds, and the peninsula of Holderness.

Western Yorkshire.—This is noted for the beauty of some of the 'dales' or upper valleys of the many tributaries of the Ouse which rise in the Pennines—*e.g.*, the Swale, Ure, Wharfe, Aire, and Don. Some of these rivers form fine waterfalls in their descent. Perhaps the loveliest valley is Wharfedale, which is unspoilt by the manufacturing carried on throughout the great Yorkshire coal-field crossed by the Aire and Don. **Harrogate,** at the base of the Pennines, a little north of the Wharfe, is a noted resort on account of its mineral springs, which have a medicinal value. The springs are due to the water which issues here having previously penetrated very far down into the earth, till it has been warmed by the hot interior and dissolved sulphur, iron, and other minerals with which it has come in contact.

The Woollen Industry.—This arose in the valleys of the Aire and Calder, on account of the good pastures for sheep and abundance of pure water for washing the wool. It increased considerably when steam-power was employed to work machinery and coal mined in the district, so that now most of the raw wool required has to be imported from Australia, New Zealand, and other countries. The great outlets for

the goods manufactured in this area are not only Goole and Hull on the east, but also Manchester and Liverpool on the west, on account of the canals and railways which cross the Pennines.

Woollen Manufacturing Towns.—Leeds, which stands on the Aire, at the base of the Pennines, is the centre of the woollen industry. It also manufactures boots and shoes and iron goods, including machinery. The city benefits by its position, which commands many routes across the plain eastwards, as well as that westwards by the Aire valley. **Bradford,** to the west of Leeds, manufactures worsted from wool, and **Halifax,** still farther west, makes carpets. Various branches of the woollen industry are also carried on at **Huddersfield, Wakefield,** and other towns.

The Valley of the Don.—The coal here is used for the cutlery industry of Sheffield, the brass foundries of **Rotherham,** and the railway stock manufactured at **Doncaster. Sheffield** lies at the marked bend of the Don, which is canalized to this point. The cutlery industry benefits by a particular kind of sandstone found with the coal in this field, which is used for making grindstones. The iron has to be imported, and most of it comes from Sweden, where it has been smelted with charcoal. **Goole** is the port on the Ouse at the mouth of the Don.

The Vale of York consists of clays and gravels, and is very fertile. Horses are reared in large numbers, and the district is dotted with agricultural centres, such as **Ripon,** on the Ure, which has a cathedral. The Vale forms a natural route northward between the Pennines and Yorkshire Moors, which is now followed by the North-Eastern Railway.

York was fortified in early times to guard the road to the North, and the massive walls, pierced by gates, which were built around it, are still standing. The Ouse is navigable, and the city stands on it at the point where it was bridged long ago. It is thus the natural collecting centre for the produce of the fertile Vale. The city has a beautiful cathedral, and is an archbishopric. It is also the county town.

The North Yorkshire Moors.—These hills are for the most part covered with heather, and have but a sparse population, save in the extreme north, in the district of Cleveland, where iron is found. Most of this iron is exported from **Middlesbrough,** at the mouth of the Tees, which also manufactures it. The Moors are separated from the Wolds by the valley of the Derwent, which allows of easy communication between York and the coast.

The Coast Scenery is very grand, and fishing stations and popular watering-places have arisen where natural ravines allow of descents being made from the high cliffs to stretches of sand along the shore. **Scarborough** is a very noted resort in a magnificent situation overlooking two bays, while the fishing station of **Whitby** is famous for the ruins of an abbey built in early times on the cliff above it.

The Wolds are rounded grassy hills, which are composed of chalk, and end in the majestic cliffs of Flamborough Head.

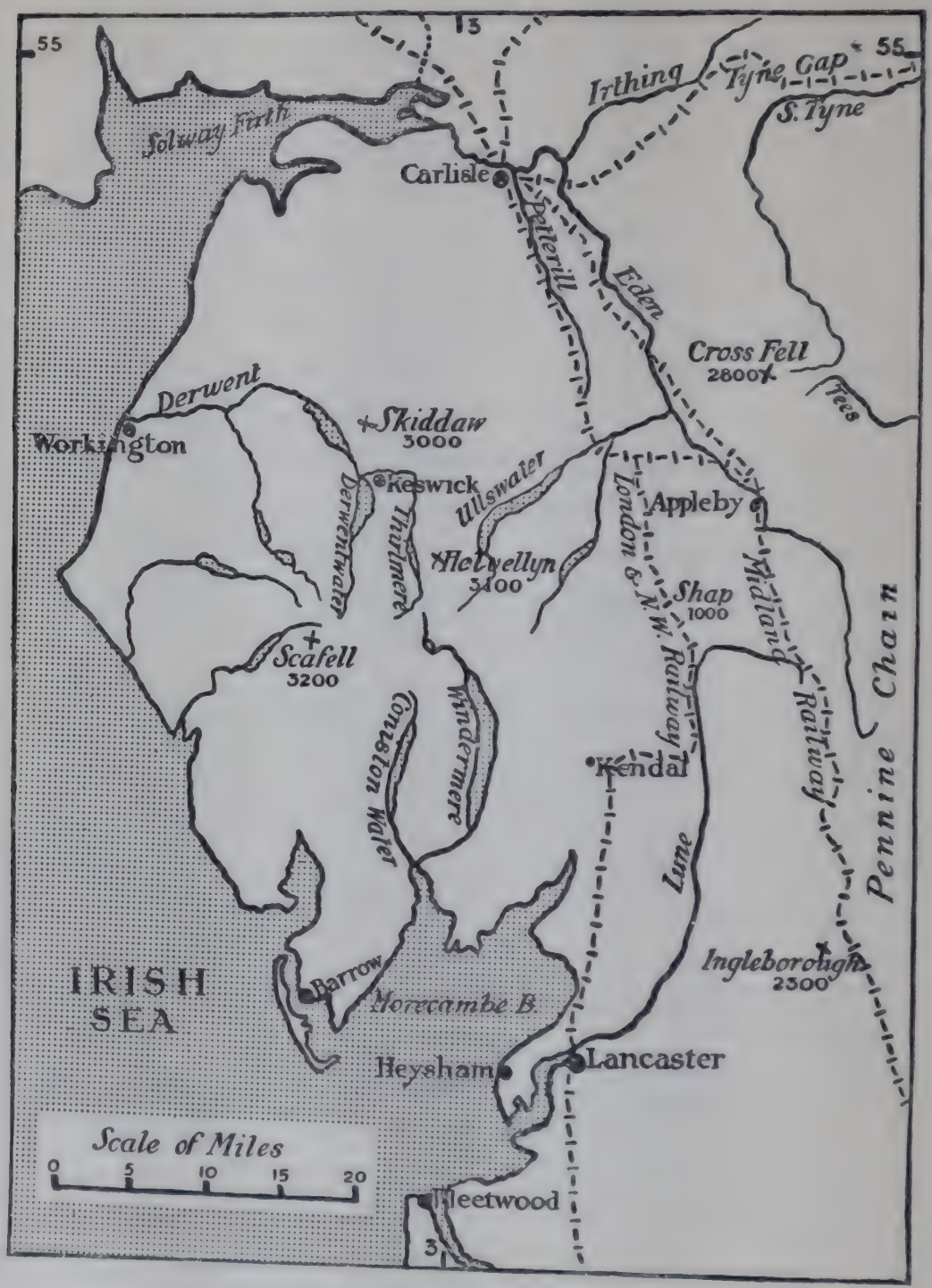
Holderness is a stretch of low land, formed of clays and gravels, which ends in Spurn Head. This area is fertile where it is not marshy. The only large town is Kingston-on-Hull, or **Hull,** which stands on the north shore of the Humber, and is a great port. It exports many goods manufactured in Lancashire and in the Midlands, as well as in Yorkshire, for it is well connected with these areas by waterways and railways. It carries on a very large trade with the Baltic and North Europe.

THE CUMBRIAN MOUNTAINS AND NORTH LANCASHIRE.

The Cumbrian Mountains are trenched by deep valleys, which radiate in all directions from a tract of high land stretching between Scafell in the west and Helvellyn in the east (see p. 28). These are the two highest peaks in the group, and Skiddaw, which is nearly as high, lies farther north. The river valleys are separated from each other by mountainous ridges, covered with grass, bracken, and heather, and are extremely beautiful.

The Lake District.—The excessive rainfall promotes a luxuriant vegetation in the sheltered parts, and supplies the numerous streams, which form picturesque falls in their upper courses, and, where the valleys are wider, expand into long, narrow lakes. The largest lake is Windermere, which is 12 miles long ; but Derwentwater is more beautiful. Water is being taken from Thirlmere in pipes all the way to Manchester to supply the needs of the inhabitants. The beauty of the Lake District has caused it to be chosen as the home of several noted artists, poets, and writers at various times. Ruskin spent the latter part of his life near Lake Coniston ; and Wordsworth lived first near Grasmere, and then near Rydal Water, both small lakes north of Lake Windermere.

Sheep-farming is the chief occupation in this district, and **Kendal**, in Westmorland, still carries on a small woollen industry. Some plumbago-mines near Derwentwater give rise to the manufacture of pencils at



THE LAKE DISTRICT.

Keswick, but the graphite has now to be imported from Ceylon. **Appleby,** the county town of Westmorland, stands on the Eden, the valley of which is followed by the Midland Railway to Carlisle.

The Cumberland Coal-Field and Furness.—The ports of **Workington** and **Whitehaven** are the outlets for the small Cumberland coal-field. More important than this coal is, however, the large supply of iron mined between Workington and Morecambe Bay. The Furness

peninsula, which is politically attached to Lancashire, is particularly rich in red hematite iron—a kind that requires no limestone to smelt it. The iron industry has led to shipbuilding at **Barrow,** where a fine artificial harbour has been created.

Morecambe Plain.—The fine stretches of sand which form the coast of Lancashire have given rise to such seaside resorts as **Blackpool** and **Southport,** which lies on the south bank of the estuary of the Ribble. From **Fleetwood** and **Heysham** steamers go regularly to Belfast in Ireland. **Lancaster,** the county town of Lancashire, stands at the head of the estuary of the Lune, which flows into Morecambe Bay. The town stands on the natural route to Carlisle from Preston by way of the valley of the Lune, Shap Fell, and the Peterill valley. This route is now followed by the London and North-Western Railway.

THE SOUTH LANCASHIRE COAL-FIELD.

The Cotton Industry.—This industry has become extremely important here, on account of many advantages which the district possesses for it, as well as the local supply of coal. The climate is extremely damp near the Pennines, in front of which the westerly winds are obliged to rise, and this damp climate enables very fine threads to be spun and woven without breaking. The Pennines, moreover, form the source of the Mersey and its tributaries, which afford water-power to towns on the mountain slopes. Most of the raw cotton used is imported from the United States, and can be easily brought either to Liverpool or Manchester.

Manchester is situated on the Irwell, a tributary of the Mersey, at the base of the Pennines, and is the meeting-point of many roads and railways, following valley routes across them. It has thus become a great centre for collecting and exporting the cotton goods made in the district round, and for distributing the raw cotton and food imported. It is, in fact, almost more important as a centre for trade than as a manufacturing city, though it has great factories in its suburbs. Besides manufacturing cotton, silk, and woollen goods, it makes a great deal of machinery, and since the opening of the Manchester Ship Canal has become a large port. It forms one town with Salford, on the other side of the Irwell, and possesses a cathedral and University.

The cotton-manufacturing towns of **Bolton, Bury, Rochdale, Oldham,** and **Stockport** (in Cheshire), form a semi-

circle round Manchester, and lie mainly on the lower slopes of the encircling north-east moorlands, where water-power is available. Oldham and Bolton are the chief spinning centres, while the most important cotton-weaving towns lie in the valley of the Ribble—*e.g.*, **Burnley, Blackburn,** and **Preston.** The salt found in Cheshire is used in the glass factories of **St. Helens** and the chemical works at **Widnes**, which is situated on the Mersey due south of St. Helens.

Liverpool, the great port of Lancashire, stands at the mouth of the Mersey. It has magnificent docks, and carries on an enormous trade with Ireland and America, as well as with many other countries. It only rose to importance with the industrial development of the region behind it, which is naturally infertile. It has also profited by the Trent and Mersey Canal, which connects it with the Staffordshire potteries, and by the canals over the Pennines, as well as by the construction of railways, which enable it to collect from and distribute to several centres of dense population. Liverpool is connected by a railway tunnel with the seaport of **Birkenhead,** on the opposite side of the Mersey.

THE ISLE OF MAN.

This mountainous island is situated in the Irish Sea, almost equally distant from England, Scotland, Ireland, and Wales. The inhabitants are a branch of the Celtic race, and enjoy complete Home Rule. The chief industries are fishing, stock-raising, and lead-mining. **Douglas,** the capital, and other towns are popular resorts for the Lancashire people.

WALES.

'A glance at the map shows that Wales is difficult to conquer. . . . The same glance shows that Wales is ill-adapted for union. Its valleys are separated from each other by high and pathless mountains; they open out on the sea of the west, or on the plain of the east. There is no central point upon which paths and roads could converge; Wales never had a capital. . . . But if the mountains of Wales made political union difficult, they gave their inhabitants the same characteristics and community of ideas and of aims centuries before combined action became possible' ('Wales,' by Owen M. Edwards).

Relief.—This country is bounded on three sides by the sea—the Irish Sea on the north, the St. George's Channel on the west, and the Bristol Channel on the south. On the east the political frontier has

WALES: PHYSICAL AND POLITICAL.

been determined mainly by the relief of the land, and divides the plain crossed by the lower portions of the Dee, Severn, Wye, and Usk, from the Uplands on the west. For a long time the Welsh were able to hold their Uplands against English invaders, but the fact that the valleys of the rivers mentioned above open out on to the English plains, and that there are coastal plains along the north and south of Wales, enabled the English to penetrate into the heart of the country and conquer it.

Rock Structure.—Most of the Welsh mountains, like those of the Highlands, have been formed by rivers cutting valleys across an original plateau—hence the comparatively uniform altitude of much of the higher ground. These mountains, which form a roughly rectangular upland region, consist of very old rocks. The oldest rocks occur in the projecting counties of Carnarvon and Pembroke, while in the south there exists a great coal-field, and a small one in the north-east round Flint and Wrexham.

Population is concentrated on the coal-fields, along the fertile coastal belts in the north and south, and in the river valleys. In the mountainous interior of the country the chief occupation is rearing sheep, and the population is very sparse. Though the national costume has been practically abandoned, it was estimated in 1891 that Welsh was the only language of 28 per cent. of the population, while 23 per cent. were bilingual. The country possesses a University composed of three colleges — **Bangor** in the north, **Aberystwyth** in the west, and **Cardiff** in the south. There are small cathedrals at **Bangor, St. Asaph** near Denbigh, **St. David's** in Pembroke, and **Llandaff** near Cardiff.

NORTH AND CENTRAL WALES.

The Snowdon District.—The mountains of North Wales may be divided into various groups, of which the most important is that around Snowdon. Though Snowdon is the highest mountain in England and Wales—3,500 feet—it is only covered with patches of snow in winter. The mountains in this area are noted for their rugged scenery ,and the grand pass of Llanberis is particularly famous. Slate is quarried at Llanberis, as well as at many other places in Carnarvon.

The Menai Straits. — In times of Welsh independence the district round Snowdon formed a natural stronghold for defence, but the people were obliged to rely for food-supplies on the low, fertile plains of Anglesey. To subdue the country, therefore, Edward I. built a castle at **Carnarvon**, to command the western entrance to the straits, and at **Beaumaris** in Anglesey, to command the eastern.

Bangor, which also stands at the eastern end of the straits, is connected with Anglesey by a suspension bridge and by a tubular bridge. The latter is used by the London and North-Western Railway, which skirts the Welsh coast and goes to **Holyhead**, where steamers start for Kingstown and Dublin. Bangor possesses a cathedral and University College. It exports large quantities of slate, quarried at small places to the south, and is a seaside resort.

The North Coast. — To the east of the Snowdon district lies another mountainous area, shut in by the Dee on the south and on the west by the Conway River, which is guarded at its mouth by Conway Castle. The coast is picturesque where a precipitous hill of limestone forms the promontory of Great Orme's Head, which shelters the bay

occupied by the popular resort, **Llandudno.** Further eastwards is another noted watering-place, **Rhyl.**

The Dee flows through Lake Bala, and then follows a beautiful valley till it enters the plain and turns northwards. On the left side of its wide estuary, in the county of Flint, there is a small coal-field, and farther south lies another, where lead and a little iron are also mined and taken to be worked at **Wrexham.** South of the Dee and Lake Bala lie the Berwyn Mountains, where rises a river that has been embanked to form Lake Vyrnwy. This lake forms the chief reservoir from which Liverpool is supplied with water.

Central Wales.—South of Snowdon a belt of mountains covered with moors stretches round Cardigan Bay, and rises to a considerable height in the peaks of Cader Idris and Plinlimmon. Plinlimmon lacks the rugged grandeur of some of the Welsh mountains, but it forms the source of many rivers, including the Severn, Wye, Towy, and Teify. Along the shore of Cardigan Bay are several popular seaside resorts, one of which, **Aberystwyth,** possesses a University College.

The Woollen Industry.—Sheep-farming is the chief occupation of the inhabitants in Central Wales, and the supply of wool originated the Welsh flannel industry. This is largely carried on in the upper Severn valley at **Welshpool, Newtown**, and smaller places in the district.

SOUTH WALES.

The Black Mountains, which include the graceful peaks of the Brecon Beacons, form the source of the Usk, Taff, and other rivers, which flow into the Bristol Channel.

The rich coal-field which occupies much of West Monmouth, North Glamorgan, and South Carmarthen, affords employment to a large number of the inhabitants; and though iron ore has now to be imported, mainly from Spain, as the local supply is comparatively little worked, there are great smelting works in the district. Railways have been constructed along the valleys for the conveyance of the coal from such mining centres as **Merthyr Tydvil** and **Aberdare** to **Newport, Cardiff, Barry, Swansea,** and **Llanelly,** on the coast.

Cardiff, with Barry, exports yearly more than one-third of the value of the total export of coal of the United Kingdom. There are also large ironworks in the vicinity. Cardiff is the largest town in Wales, and possesses a University College. Not far off is Llandaff, with its cathedral.

The South Coastal Plain.—West of Cardiff the undulating belt of country between the mountains and the sea, called the 'Vale of Glamorgan,' is picturesque and fertile. Its fertility, in fact, early attracted invaders, who gradually pushed as far west as Pembroke, and built castles to subdue the Welsh. The coast is broken by the two great bays of Swansea and Carmarthen. The shores of these bays are low and sandy, but they are divided by the limestone cliffs of the Gower Peninsula, which end in Worm's Head. At **Swansea** and **Llanelly,** on opposite sides of this peninsula, there are large tin and copper works, though both these metals have to be imported.

Pembroke.—The rugged coast of this county, which is broken by the fiord-like inlet of Milford Haven and St. Bride's Bay, is extremely picturesque, and Tenby is a popular resort. The fine natural haven or harbour of Milford is utilized by the Royal Navy, for which ships are built at **Pembroke Dock.** A branch of the Great Western Railway, which follows the south coast to Pembroke Dock, has been built to **Fishguard** in North Pembroke, whence steamers ply to Rosslare in Ireland. Fishguard is now also the calling-place for some of the American liners. The little town of St. David's, near the headland of that name, has a small ancient cathedral.

THE MIDLAND PLAIN.

Relief and Natural Regions.—This plain lies between the Pennines, the Welsh Uplands, and the somewhat broken line of hills composed of the Cotswolds, Edge Hill, the Northampton Uplands, and Lincoln Edge. The region largely consists of red fertile clays and gravels, but coal occurs in several places (see p. 35). Away from the coal-fields the area forms a rich agricultural district, while its flatness has facilitated the construction of roads, railways, and canals. The plain can be divided into the Welsh Borderland and the Central Midlands.

THE WELSH BORDERLAND.

The Marches.—This consists of the Cheshire plain in the north and the basins of the Lower Severn and Lower Wye in the south. The region was of great strategic importance in former times, and to protect it from invasion by the Welsh the Normans and English built castles at towns on the rivers which form natural routes from the Welsh Uplands.

CENTRAL AND SOUTHERN ENGLAND: NATURAL REGIONS.

THE MIDLANDS AND EASTERN ENGLAND: PHYSICAL AND POLITICAL.

Thus **Chester** guarded the Dee, **Shrewsbury** the Severn, **Ludlow** the Teme, and **Hereford**, **Monmouth,** and **Chepstow** the Wye. The Normans also created three great earldoms with military centres at Chester, Shrewsbury, and Hereford. These were called the Marcher Earldoms, or the Marches, the word 'march' here simply meaning a frontier. In modern times a railway has been built connecting all the Border towns mentioned above, which lie in nearly a straight line at the base of the Uplands.

The Cheshire Plain is flat, and has excellent pastures for cattle. The country is therefore noted for cheese as well as for salt, which is mined at **Northwich** and other places. The position of the plain between the Pennines and Welsh Uplands made it important in times of war in the past, and for trade at present, since routes to the north and west run naturally across it. **Crewe,** on the North-Western line from London, has become a great railway junction, whence lines branch to Manchester and the North, and to Chester and the West. It has also large engine works. **Macclesfield** carries on a silk industry.

Chester, which guarded the north-coast route, and is nearly surrounded by the Dee, still possesses its city walls and the ruins of its castle. Its walls, castle, and cathedral are built of the local red sandstone, while its many quaint old gabled houses are of brick, timber, and plaster. Some of these houses have covered galleries, called 'rows,' along the second story.

The Basins of the Lower Severn and Wye.—The Severn, which rises in Plinlimmon, turns first north and then east, until, after passing near the isolated mountain called the Wrekin, it bends southwards. Then it winds in a broad valley between the Malvern Hills and Cotswolds till it enters the wide, shallow estuary which finally merges into the Bristol Channel. The chief tributary on the right bank is the Teme, and on the left the Upper Avon. The rivers which flow into the Severn estuary, as the Wye, Usk, Taff, and Lower Avon, are also sometimes considered as tributaries. **The Wye,** which also rises in Plinlimmon, is noted for the beauty of its course after passing Hereford. The scenery is particularly grand below Monmouth, where the river flows through a gorge between high, well-wooded limestone cliffs, and the ruins of Tintern Abbey stand in a romantic situation on its banks. At the mouth of the Wye is Chepstow, with a ruined castle.

The climate of the lower basins of the Severn and Wye is peculiarly

mild, so that the counties of Hereford, Worcester, Gloucester, and Monmouth are noted for their orchards and hop-gardens, as well as for dairy produce. This agricultural wealth facilitated the erection of cathedrals at Hereford, Worcester, and Gloucester. The small coal-field of the Forest of Dean lies between the Severn and the Wye.

English Towns in the Severn Basin.—Shrewsbury, the capital of Shropshire, is nearly surrounded by a loop of the Severn, and stands at a convenient crossing-place. **Worcester** is situated near the junction of the Teme and Severn. It manufactures china and gloves. **Droitwich,** not far from Worcester, has salt springs; while medicinal springs, combined with beautiful scenery, have made Malvern on the Malvern Hills in Worcestershire, and Cheltenham at the base of the Cotswold Hills in Gloucestershire, favourite inland resorts. **Gloucester** arose where the Severn was bridged in early days, and at the head of sea navigation. On account of the silting up of the estuary the Berkeley Ship Canal has been made, to allow fairly large vessels to reach Gloucester, and to avoid some of the river windings.

The Severn Estuary.—The difference in the height of the water at low and high tide is very great in the Bristol Channel, and especially in the Severn estuary. At Avonmouth the difference is sometimes 40 feet. The long, narrow shape of the Severn estuary also causes the ascending tide to form a great wave at the time of high 'spring' tides, which is called a 'bore.' A tunnel 4½ miles long has been made by the Great Western Railway Company under the Severn near Chepstow, to shorten the distance between many places in England and South Wales.

Bristol.—The chief port of the Severn basin is Bristol. It stands on the Lower Avon, about 6 miles from Avonmouth, where docks have been built which can accommodate the largest vessels. Bristol imports large quantities of cereals, provisions, and dairy produce from America and Ireland, and fruit from the West Indies. Its industries include flour-milling and the manufacture of tobacco and chocolate, but its exports are relatively small. There are small coal-fields in the neighbourhood. Clifton is a fine suburb of the city, and the Avon, which here flows through a gorge, is crossed by a suspension bridge.

The Cotswold Hills.—The Lower Avon rises in the Cotswolds, and then curves south of these hills past **Bath.** This city has been famous since Roman times for its hot medicinal springs, which attract many invalids. Freestone is quarried near Bath from the Cotswolds,

which are composed of oolitic limestone. These hills are devoted to sheep pastures, which gave rise to a woollen industry at **Stroud** in Gloucestershire, **Bradford** in Wiltshire, and some other towns. The industry benefits by the Bristol coal-fields, but suffers from competition with the Yorkshire factories.

THE CENTRAL MIDLANDS.

This region is crossed by the Upper Avon tributary of the Severn and the Trent.

The Upper Avon flows through a rich agricultural district. On it stands **Rugby,** noted for its public school; **Leamington,** an inland watering-place; **Warwick,** with its stately castle; and **Stratford,** where Shakespeare was born. A little north of Warwick lies **Kenilworth,** famous for its large castle, now in ruins, and not far distant is **Coventry,** where cycles are manufactured. The Avon joins the Severn at **Tewkesbury,** where there is a beautiful abbey.

The Trent bends round the southern end of the Pennines, and then flows northwards to the Humber. Several coal-fields lie in its basin and support many industries.

The Potteries.—The coal of North Staffordshire is used in manufacturing earthenware at **Stoke-upon-Trent, Hanley,** and other towns in the vicinity, as suitable clay exists there. The towns also manufacture china, but the kaolin, or decomposed granite, used for this has to be brought from Devon and Cornwall. **Stafford,** a little south of this district, manufactures boots and shoes.

The Black Country.—The coal from the fields of South Staffordshire and North Warwickshire is mainly devoted to the manufacture of iron goods, though nearly all the iron used has to be imported. This district is sometimes called the Black Country, on account of the piles of cinders, the smoke from the great furnaces, which are kept burning night and day, and the lack of vegetation. Various towns specialize in the manufacture of different kinds of hardware—*e.g.*, **Bromsgrove** (Worcestershire) in nails, and **Redditch** (Worcestershire) in needles and fish-hooks, while **Walsall, Wolverhampton,** and **West Bromwich,** in Staffordshire, manufacture almost every conceivable kind of iron and steel article. Walsall also has a saddlery industry, and **Stourbridge** in Worcestershire makes fire-bricks, and **Kidderminster,** in the same county, carpets.

Birmingham is the great trade centre of the district, as it is easily able to collect and distribute goods by means of the many canals and railways radiating from it (see p. 51). It also manufactures steam-engines and firearms, and is particularly noted for small metal goods and jewellery. The city possesses a University.

Burton-upon-Trent is situated near the confluence of the Dove. It has become the largest beer and ale brewing centre in the country, mainly on account of the suitable quality of the water there. Some of the barley required is grown in the Trent Basin, but the hops are brought from the basins of the Lower Severn and Wye and elsewhere.

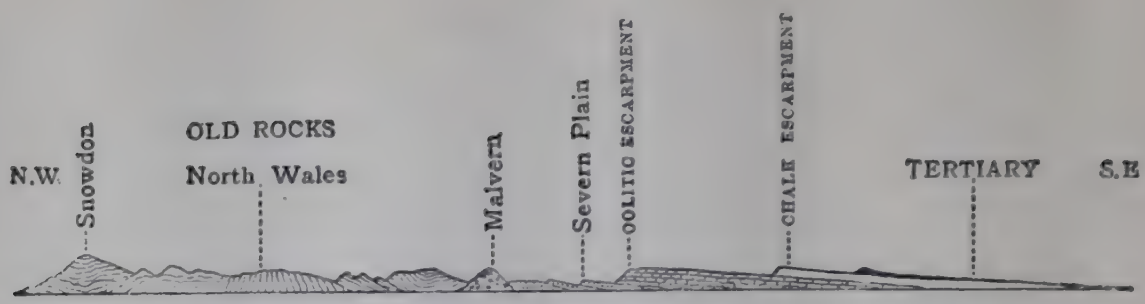
The Derby and Nottingham Coal-Field.—A little below Burton the Trent receives the Derwent from the Pennines, on which stand Matlock and Derby. **Derby** is an important railway junction, and the Midland Railway Company has erected great engineering works here. It lies just to the south-east of the Derbyshire coal-field, and the presence of coal has encouraged the manufacture of china, silk, and other goods. The pure quality of the water of the Pennine streams is a great advantage in dyeing the silk. At **Nottingham**, on the Trent, the coal of the field to the north-west is used in the manufacture of cotton hosiery and cotton lace.

The Leicestershire Coal-Field.—Leicester stands on the Soar tributary of the Trent in this small coal-field. It is noted for its woollen hosiery, and also manufactures boots and shoes. These industries probably owe their origin to the cattle and special breed of sheep reared in the district, but most of the wool and hides required have now to be imported.

The lower course of the Trent lies through a district where large crops of wheat and roots are grown, and **Newark** and **Gainsborough** are agricultural centres. The remains of Sherwood Forest add to the beauty of Western Nottinghamshire, and so many handsome houses of the nobility have been built there that one district is called the 'Dukeries.' High tides ascend the Trent to a point above Gainsborough in the form of a bore called an 'ægir.'

EASTERN ENGLAND.

Relief and Natural Regions.—Though most of this region is low, it is crossed by two chains of hills which stretch from the south-west to the north. One of these chains has been already described as com-



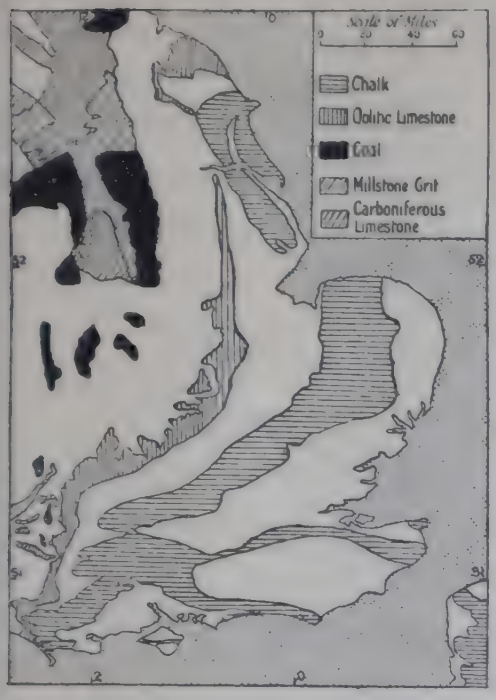
SECTION ACROSS ENGLAND AND WALES. (After Ramsay.)

posed of the Cotswold Hills, Edge Hill, and Lincoln Edge. This chain lies just east of the Upper Avon and Lower Trent. It is formed of oolitic rocks, which also occur in the North Yorkshire Moors, and extend south of the Cotswolds to the English Channel. The other belt of hills starts from Salisbury Plain, and includes the Marlborough Downs, Chiltern Hills, East Anglian Heights, and the Lincoln Wolds. This belt is composed of chalk, and is continued farther north in the Yorkshire Wolds (see p. 41).

The hills in both belts have a steep slope to the north-west, and a gradual one to the south-east. They are, in fact, 'escarpments,' formed ages ago by the layers of the rocks of which they are composed having been tilted towards the south-east. Population is somewhat sparse on these hilly belts, but between them lies a low, fertile, well-populated plain. This plain can be divided into the valley of the Upper Thames and the basin of the rivers which flow into the Wash. Between the chalk hills and the North Sea is another plain, of which the southern portion is the valley of the Lower Thames, and the rest is known as the East Anglian Plain (see p. 35).

THE BASINS OF THE WASH RIVERS.

The rivers which flow into the Wash are the Witham, Welland, Nen, and Great Ouse. On account of the flatness of the land, the sluggish rivers have had to be confined by high banks to prevent their overflowing. The basin is mainly devoted to growing wheat, pulses, and root crops, but cattle and sheep are also reared. Such industries as exist are chiefly connected with the needs and products of farming, and are somewhat hampered through lack of coal in the area. Agricultural implements are made at **Lincoln, Peterborough,** and **Bedford. Lincoln** arose around a castle built on a commanding height above the Witham, which here flows in a gap across Lincoln Edge. It has also a cathedral. **Peterborough,** on the Nen, another cathedral city, is



EASTERN ENGLAND: GEOLOGICAL.

The parts left white are chiefly composed of soft shales, clay, gravel, sand, and soil deposited by the rivers. These rocks, being soft, have been worn away more quickly than the harder ones, and so these areas are relatively low.

an important railway centre, and the Great Northern Railway Company has large locomotive works there. **Northampton,** on the Nen, manufactures boots and shoes; **Bedford,** on the Great Ouse, and other towns in Bedfordshire, carry on straw-plaiting; and **Huntingdon,** also on the Ouse, is a market centre. **Cambridge,** situated on the banks of the Cam, a tributary of the Great Ouse, is the seat of a great University, enriched largely by agricultural endowments. The beauty of the college gardens and grounds, which stretch to the river and are called 'The Backs,' has long been famous.

The Fens.—The Wash is shallow, and is being gradually filled up with the sand brought by the tide and the silt let fall by the rivers. Its shores are low and marshy, and much of the district near it, which is called the Fens, was once a shallow sea or vast swamp. Even in the time of William the Conqueror **Ely** was an island beside the Ouse, which thus formed a suitable retreat for Hereward the Wake. Later, this island was crowned with a cathedral, and the surrounding country was drained. Most of the region is, in fact, now excellent agricultural land, though a few parts are still studded with pools and haunted by water-fowl. Lord Avebury, in 'The Scenery of England,' writes: 'Unpicturesque as the Fens may appear to some, they possess a beauty and mystery of their own. Those who know them love them; they delight in the low rows of trees, the occasional windmills, the wide expanses which give a sense of space and freedom, the calm sheets of water fringed with tall reeds and sedges and grasses, and the beautiful atmospheric effects.' Windmills are common in the Fens, for the flat nature of the ground allows the winds to sweep uninterruptedly across it. Most of the mills are used for making flour.

The chief ports along the Lincolnshire coast are **Great Grimsby,** near the entrance to the Humber, and **Boston.** Both are fishing stations for the North Sea fleets.

THE EAST ANGLIAN PLAIN.

This plain extends over the eastern portion of Norfolk, Suffolk, and Essex. The soil consists of clay, gravel, and sand, and a great deal of wheat and barley is grown here, as well as on the chalk hills which border the plain on the west and are overlain with clay. Wheat flourishes here, as the stiff soil, comparatively dry climate, and warm summers, suit it (see p. 65). The soil is also suited for root-crops as potatoes and turnips, as well as for peas, beans, mustard and strawberries.

Towns.—The chief towns in this plain are therefore market centres, with industries connected with agriculture. **Chelmsford,** the capital of Essex, and **Ipswich,** the capital of Suffolk, manufacture agricultural implements ; and **Norwich,** the capital of Norfolk, also manufactures mustard and starch. Norwich has a castle and cathedral. It stands close to the Yare, which is navigable from this point to Yarmouth, at its mouth.

The Broads.—The shallow pools and marshes, which are known as the Broads, in Southern Norfolk and on the border of Suffolk, have been formed through the silting up of the mouths of some of the rivers in this district. These lakes, and the network of connecting waterways, are bordered, and sometimes overgrown, with bulrushes, tall reeds, and water-plants. They abound in fish and water-fowl, and form pleasant holiday resorts for boating. Most of the Broads, however, are becoming slowly filled up by water-plants and sediment deposited by the rivers. They vary, too, a good deal in size according to the rainfall.

The Coast.—Four miles off the coast of Norfolk, near Yarmouth, the sea-currents have created a large sand-bank, and the water between this and the mainland is called the Yarmouth Roads. **Yarmouth** is a great fishing centre, especially noted for smoked herrings, called ' bloaters,' and **Lowestoft,** a little farther south, is also engaged in fishing. **Harwich,** at the mouth of the Stour estuary, in the extreme north of Essex, has become an important packet-station for the Continent, and steamers go regularly from here to Antwerp, the Hook of Holland, and Hamburg. **Colchester** is noted for the oyster-beds in the River Colne, on which it stands. The large shallow estuaries of the Stour, Colne, Blackwater, and other rivers, are a marked feature of the southern coast. Farther north, in Suffolk, the sea is destroying the coast so rapidly that the sites of once famous towns now lie under the water.

THE THAMES BASIN.

The Thames rises in the Cotswolds, and flows eastward until, at Oxford, it receives the Cherwell, flowing southward. Here it changes its course and flows south across the chalk belt passing between the Marlborough Downs and the Chiltern Hills. At Reading the Kennet, from the west, joins the Thames, and the latter again changes its course, and flows eastward. On the south it receives the tributaries Wey, Mole, and Medway, and on the north the Lea. It enters the North Sea through a wide estuary. The river is navigable throughout the greater part of its course of over 200 miles, and is well connected by canals with the Severn and the Midlands. It has always been an important waterway leading into the heart of the country. London, on its banks, has become the greatest city in the world. The Thames forms a county boundary throughout most of its course.

Towns in the Basin.—Several towns of historic note besides London are situated in this area. **Oxford** stands at the junction with the Cherwell, amidst the rich agricultural lands which have helped to endow its beautiful University Colleges. Many of these have lovely gardens, while the Thames and Cherwell afford delightful opportunities for boating. The royal residence of **Windsor Castle** is situated in pretty scenery, and conveniently near London. **Eton,** near by, is noted for its public school. The absence of coal and the overwhelming attraction of London have not favoured the rise of other large industrial places in the Thames Basin. **Reading** is noted for its biscuits and seeds, and **Aylesbury**, in Buckinghamshire, for dairy produce.

LONDON.

London arose on the Thames at the head of ocean navigation, and at the lowest point where the river could be easily forded and bridged by the Roman invaders. Roads, too, were easily constructed, radiating from it in all directions over the country, and it became a great trading centre. In modern times its trade has been greatly increased, for the city has become the centre of the railway system of the country.

The heart of the City still lies, as in early days, on the slightly raised piece of land between the Lea and the Thames ; but the marshes along these rivers, which then helped to defend the site, have been drained. In this corner, near London Bridge, stands the Bank, Royal Exchange,

St. Paul's Cathedral, and the Tower. From this spot a road, which still called the Strand—though, on account of the modern Embankme no longer at the river's edge—was made westward to Westminster, wh the Houses of Parliament and the beautiful Abbey were built in cou of time.

Towards the north and west of the City are many handsome stree of large shops and mansions, and such famous public buildings as t National Gallery, the British and South Kensington Museums, and t colleges of the London University. There are many parks in this pa of London, of which one, called Regent's Park, has famous Zoologic Gardens, while still farther north lies Hampstead Heath, at the top a hill.

The Thames did not long prove a barrier to the extension of the Cit and on the bank south of the river, as well as in East London, vario industries have sprung up to supply the needs of the dense population- *e.g.*, sugar-refining, and the manufacture of clothing, furniture, jar soap, matches, candles, etc. The enormous local demand for good especially for food products and coal, has given rise to a large impo as well as export trade, and great docks have been made along the rive From these docks ships and steamers sail to the great ports all over t world.

Around London there is a ring of important suburbs, which are no so closely connected with the City that with it they are said to for Greater London. This roughly extends over an area within 14 mil of the centre of the City, and includes places like **Croydon,** in Surre and **West Ham,** in Essex. Its total population is over seven millio —*i.e.*, far greater than that of Scotland or Ireland. West of Lond on the Thames lies **Kew,** with its famous Botanical Gardens, and ea of it are **Greenwich,** which sets the time for Britain, and **Woolwic** with its great arsenal.

SOUTH-EASTERN ENGLAND.

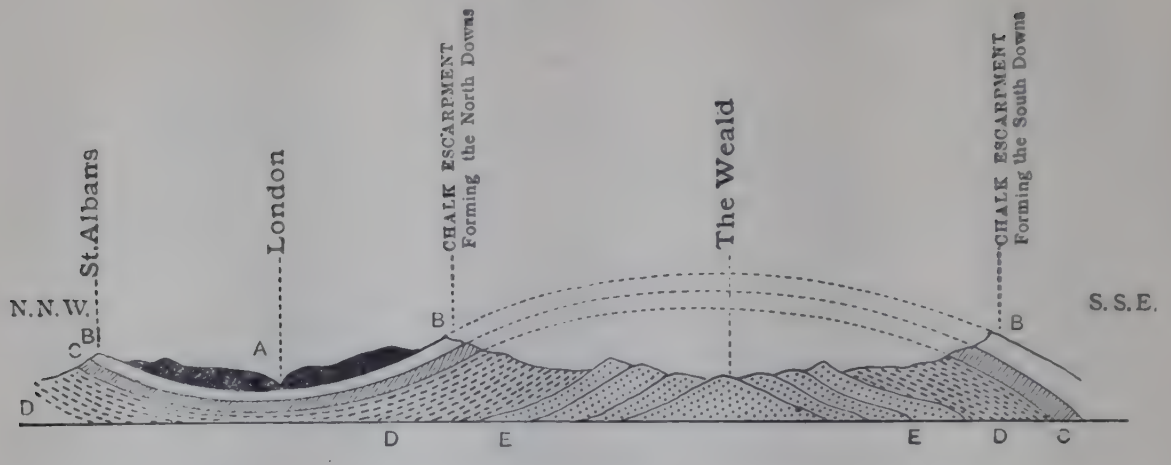
Relief and Natural Regions.—South-Eastern England is cross by several ranges of chalk hills, which branch in different directio from a central area called Salisbury Plain (see p. 35). This is a rath high, grassy expanse of country, which is only sparsely populated, a is therefore often used for military manœuvres. On it stands a circ of great stones, known as Stonehenge, which was erected very long ag

SOUTH-EASTERN ENGLAND: PHYSICAL AND POLITICAL.

From Salisbury Plain the Marlborough Downs stretch north-eastward, the North Downs eastward, and the Western Downs south-westward. Between the North and South Downs lies a hilly district composed of sandstone, sand, and clay, called the Weald; and between the South and Western Downs lies a lowland area, composed of sand and clay, called the Hampshire Basin.

THE NORTH AND SOUTH DOWNS AND WEALD.

Structure.—The whole of this area must have originally been covered with chalk, and have then been uplifted along a central axis running east and west, so that rivers rising in the higher central belt would naturally flow northwards to the Thames or southwards to the Channel. Afterwards the central part of the arch was eroded, exposing the rocks underneath the chalk, and completely separating the chalk area which forms the North Downs from that called the South Downs. In the diagram on p. 46 you will notice the gradual slope of the North Downs on the north, and the steep escarpment on the south, and the reverse with the South Downs. You will also see how the chalk of the North Downs dips under the London Basin, where it has been reached by boring, and reappears north of this area in the Chiltern Hills.



SECTION ACROSS S.E. ENGLAND.

A = London clay.
BB = Chalk.
CC = Lower Greensand.
DD = Weald clay mainly.
EE = Hastings sand.

The dotted lines indicate the original upfold of the rocks before erosion took place.

Scenery.—The gently rounded surfaces of the Downs are mainly covered with grass, and devoted to sheep-rearing. The North Downs broaden out towards the sea, and form high white cliffs at South Foreland and Dover; while the South Downs end in white cliffs at Beachy Head. North Foreland, on the peninsula and former island of Thanet, is also the end of an isolated mass of chalk, but Dungeness is only a mass of shingle deposited by the tide.

The Coast Towns.—Along the coasts of Kent and Sussex are many popular seaside resorts, such as **Margate, Ramsgate, Hastings,** and **Brighton**; and packet stations, as Dover, Folkestone, Newhaven, and Queenborough, as well as the naval station of Chatham and the arsenal of Sheerness. **Dover** was early defended by a castle, which is still kept in repair as a fortress. A fine artificial harbour has been made at this port, which is the packet station for Calais. **Folkestone** is the packet station for Boulogne, **Newhaven** for Dieppe, and Queenborough, on Sheppey Isle, for Flushing.

Inland Towns.—The North and South Downs are broken by gaps formed by the rivers which rise in the Wealden Hills, and flow northward or southward. Towns have grown up in these gaps, which have gained importance from the traffic that naturally follows these valley routes. Thus **Guildford,** the capital of Surrey, stands in the gap formed by the Wey; **Maidstone,** the capital of Kent, in that of

ıe Medway; and **Lewes,** the capital of Sussex, in a gap in the South ›owns, formed by the Ouse, which flows into the English Channel. ›wns have also arisen on the rivers where they leave these aps, such as **Rochester** and **Chatham**, at the mouth of the Medway, ıd **Canterbury**, on the Stour. Canterbury possesses a beautiful old thedral, and is, like York, an archbishopric.

The Weald was formerly covered with forests, and though many these have been cut down patches remain. The district is now famous r its cherry and plum orchards, and for its hop-gardens. **Tunbridge Wells** is a favourite resort noted for its medicinal waters.

Routes.—Many railways radiate from London over this area. The ıief are the London, Chatham, and Dover line, which skirts the north ıse of the North Downs, and passes through Canterbury; the South-astern line to Folkestone, which has to cross the North Downs and ıen traverse the Weald; and the line to Brighton, which passes through ıe North Downs in a gap south of Croydon, and the South Downs tunnels.

THE HAMPSHIRE BASIN AND ITS MARGINS.

This basin is crossed by several small rivers, which rise in the chalk ›lands, and the towns of **Dorchester** (capital of Dorset), **Salisbury** apital of Wiltshire), and **Winchester** (capital of Hampshire), have ıisen where three of these rivers leave the uplands for the lowlands. ılisbury has a beautiful cathedral, and Winchester is a very old town, hich was at one time the capital of England.

The coast of the Hampshire basin, which stretches from St. lban's Head to Selsey Bill, is low and broken by three large inlets. ne lies just west of the popular seaside resort of **Bournemouth;** ıother is Southampton Water, so named from the great port of South-ıpton on it; and a third forms the harbour for the great naval station **Portsmouth. Southampton** is an important mail-packet station, ıd the calling-place for many ocean liners, and has, moreover, a great port and import trade. It possesses the advantage of having four gh tides every twenty-four hours; for the tidal wave sweeps up to it und both sides of the Isle of Wight, bringing high tide at different nes.

The New Forest lies between Southampton and Bournemouth. consists largely of oak-trees, and is very dense in parts; but it also

includes open stretches of heath and greensward, merely dotted with trees. A hardy breed of ponies run wild in the district. Opposite Hampshire is the **Isle of Wight,** which is separated from it by the Solent and Spithead. A belt of chalk stretches across the middle of the Island, and this forms the rocks called the Needles. The climate is so mild and the vegetation so luxuriant that the island has been called the Garden of England, and many people resort to the capital, **Newport,** and other towns.

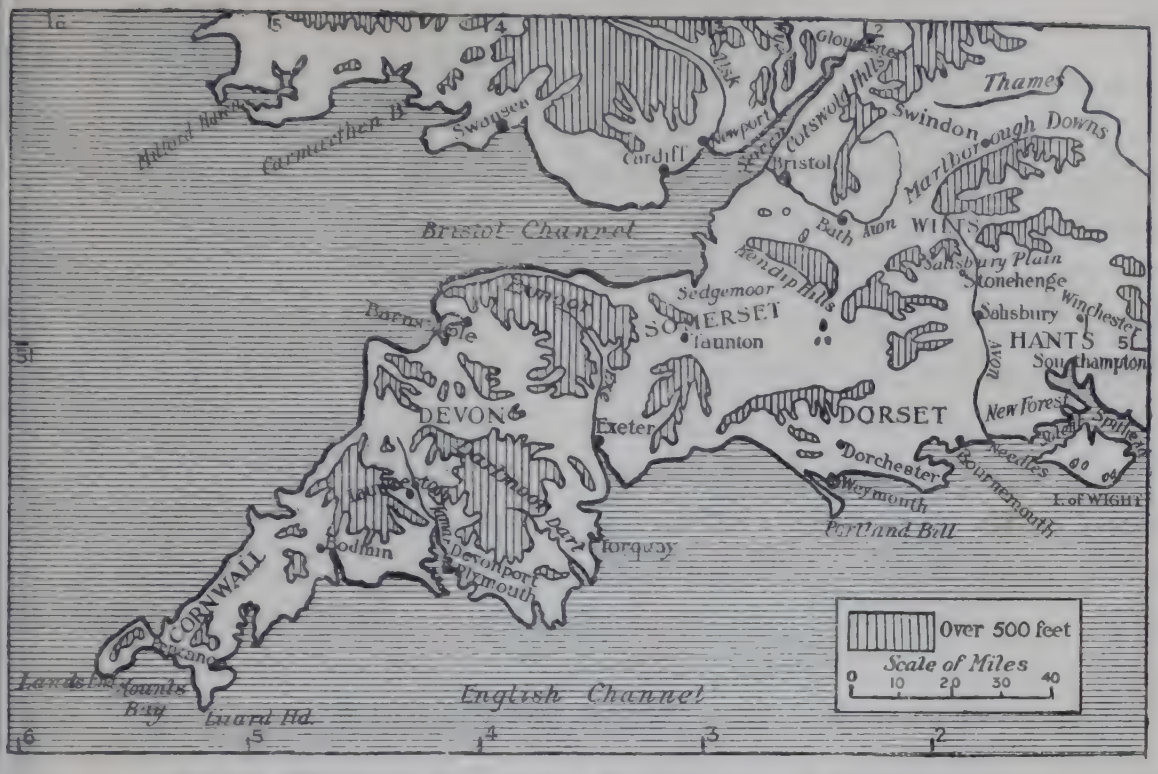
Routes.—The chief railway in the south is the South-Western line to Salisbury, which skirts the North Downs till it has to ascend the chalk plateau. A branch goes to Winchester and Southampton. Further north the Great Western Railway connects Reading and Bath by two different routes. One line turns north of the Marlborough Downs and passes through **Swindon,** where the Company have established great locomotive works; another has a more direct course to the south of the Downs, along the valley of the Kennet, and through the market town of **Devizes.**

SOUTH-WESTERN ENGLAND.

Relief. — This peninsula includes part of Dorset and most of Somerset, as well as Devon and Cornwall. It consists of a series of uplands separated by small plains and river-valleys.

Western Dorset.—In the extreme west of Dorset, and in some places along the coast, occurs the same oolitic limestone as that which forms the Cotswolds and the ranges to the north-east. The limestone which forms the end of the promontory called Portland Bill is particularly good for building purposes, and is quarried by convicts from a great prison situated there. Portland Bill is joined to the mainland by a long strip of low shingle, called Chesil Beach, which shelters the harbour of **Weymouth.** This town is a seaside resort and a packet station for the Channel Isles.

The Plain of Somerset, which lies between the Mendip Hills and the hills which lie east of Exmoor, is crossed by several small rivers. It was probably a shallow sea, bordered by extensive marshes, in the days in which Alfred the Great took refuge on one of the islands which studded it. In spite of much that has been done since then to drain the land, bogs still exist in places, and peat is cut for fuel on Sedgmoor and elsewhere. In the fertile parts of Somerset there are rich pastures for cattle, and many orchards, most of the apples being used for cider.



SOUTH-WESTERN ENGLAND: PHYSICAL AND POLITICAL.

The chief towns in Somerset are **Taunton,** the county town, which stands on a natural route leading south-westward into Devon, **Weston-super-Mare,** a growing seaside resort, **Bridgwater,** where bricks are made, and the little city of **Wells,** with its beautiful cathedral and the ruined Abbey of Glastonbury, which stand at the foot of the Mendips. Not far from Wells, and at the entrance to a gorge in the Mendips, noted for its caves, stands Cheddar, which has given its name to a kind of cheese made in the district. The Mendips near Cheddar consist of carboniferous limestone, and the gorge and caves decked with stalactites resemble those in the Peak distrinct ad are due to similar causes (see p. 24).

Exmoor occupies the south-west of Somerset and north-east of Devon, and is a plateau composed of red sandstone. The region is covered with heather, bracken, and coarse grass; and here the red deer still run wild, and hardy breeds of sheep and ponies are reared. Part of the moor is uninhabitable, on account of bogs, but its seaward slope is broken by deep picturesque valleys, where seaside resorts have arisen, of which the most popular is **Ilfracombe.**

Dartmoor is another plateau, which occupies the south of Devon. Like most of Exmoor, it is treeless, save in the valleys, but is composed of granite. Here and there the granite forms rocky bosses, called 'tors,' and in some parts has decomposed into clay, which forms dangerous bogs.

The bogs have rendered the region suitable for the establishment of a convict station, because escape from it is difficult. Some of the clay, called 'kaolin,' is sent to the Staffordshire potteries for making china. Several small streams rise on Dartmoor, one of which—the Dart—is very famous for its beauty.

The Plain of Devon separates Exmoor from Dartmoor, and extends from Barnstaple Bay to the mouth of the Exe. It is so rich a pastoral area that Devon has become noted for its dairy produce. **Exeter,** the county town of Devon, stands at the head of the estuary of the Exe. It has a fine cathedral. The south coast of Devon is very picturesque, and this and the mild climate have encouraged the rise of health resorts, of which the largest is **Torquay.** Devon is divided from Cornwall by the Tamar, which ends in the long, branching inlet called Plymouth Sound. This forms a magnificent harbour, as it is protected by an artificial breakwater. **Plymouth** is a great naval station, and has grown so large that it may be said to form one town with Devonport and Stonehouse. It is also a trading port and fishing station. Opposite the Sound, and out at sea, stands the famous Eddystone Lighthouse.

The Cornish Moors.—Plateaus composed of granite, like Dartmoor, occur in places throughout Cornwall, and end in grand cliffs at Land's End, while near the Lizard a rarer igneous rock, called 'serpentine,' is found. These moors are unsuited for agriculture, and their inhabitants have to find employment in cattle-rearing, quarrying granite, and tin-mining. A large number, too, are occupied round the coast in fishing for mackerel and for pilchards, which are merely sardines grown larger. There are no very large towns in Cornwall. **Bodmin,** the capital, stands in a valley almost in the middle of the county, and is a market town, as is also **Launceston,** in the valley of the Tamar. Around the coast various watering-places have arisen on account of the grand scenery and mild climate, such as **Penzance,** on Mount's Bay, and **Falmouth,** at the mouth of the beautiful estuary of the Fal River. These places are also fishing ports. Mount's Bay is named after St. Michael's Mount, a granite rock in the Bay, which becomes an island at high tide.

The Scilly Isles, which lie west of Land's End, grow flowers and early vegetables, which are sent to England for sale.

GREAT BRITAIN: WATERWAYS.

Only the principal canals and navigable portions of the rivers are shown.

THE CHANNEL ISLES.

The islands of Jersey, Guernsey, Alderney, and Sark, off the coast of France, belong to the United Kingdom, but are mainly self-governing. The islands enjoy a warm, sunny climate, and many early potatoes, tomatoes, and grapes are grown for the English market. The scenery round the coast is very beautiful, for the rocks in many parts are of red granite. The largest islands, Jersey and Guernsey, have given their names to the breeds of small, fawn-coloured cows which are reared there. Steamers run daily from **St. Helier,** the chief town of Jersey, to Weymouth in about seven hours in fine weather, and to Southampton in nine. Most of the inhabitants speak French more naturally than English.

IRELAND: PHYSICAL AND POLITICAL.

IRELAND.

On account of the relief of Ireland, it can be divided into a Central Plain, which extends from the east coast to Donegal Bay and Galway Bay on the west, and four surrounding districts where the surface is mountainous (see p. 53). Politically, Ireland is divided into the four provinces of Ulster, Leinster, Connaught, and Munster. As Reclus has stated in his work on the British Isles (chapter xv.): 'The distribution of the mountain groups and the configuration of the coast explain, in a measure, the fate of the country. . . . Ulster was, above all, exposed to incursions from the Scotch; Leinster and Meath appeared to be intended by Nature to fall an easy prey to the English; whilst Munster, on the open Atlantic, attracted Phœnicians and, later on, Spaniards, Algerines, and French to its hospitable bays. Connaught, the most remote of the provinces, afforded a last refuge to the indigenous population flying before conquering invaders.'

IRELAND: NATURAL REGIONS.

IRELAND: PROVINCES.

THE CENTRAL PLAIN.

The prevailing rock in the interior of Ireland—grey, carboniferous limestone—is constantly in evidence in the cottages and walls dividing the fields, built of loose stones, and in the slabs of bare rock protruding in places through a thin coating of soil.

Bogs.—In many parts the limestone is overlaid by bogs, which are covered with moss, coarse grass, reeds, heather, and low shrubs, but are almost destitute of signs of habitation. The largest bog, known as the Bog of Allen, occupies much of the plain between the Liffey and the Shannon. These bogs are partly due to the heavy rainfall in Ireland, and partly to the saucer-like shape of the country, which causes much of the water to flow towards the centre and there to form shallow lakes. In places where these lakes are stagnant, and where beds of clay prevent the water from sinking into the ground, they gradually become overgrown with moss and water-plants. In course of time this vegetation decays, and in time, too, is pressed closer and closer together, and thus a bog is formed. The usual colour of the bogs of the plain is red or dark brown, and the streams which wander through them are generally sluggish and dark-hued. The bogs vary in thickness from a few feet to fifty or

more, and if they are thin the land can be rendered fit for cultivation by cutting away the bog down to the soil on which it rests. The bog which is cut away is dried to form peat, which is the common fuel in Ireland, as the country has very little coal.

Climate and Productions.—The mild, wet climate, due to the exposure of the country to the prevailing south-west winds, causes the vegetation to be so green that Ireland has been called the ' Emerald Isle.' On account of its rich pastures it is noted for its horses, cattle, and dairy produce ; but the chief crops are oats and potatoes, as the climate is too wet to grow much wheat. Most of the farmers and cottagers rear pigs and poultry. Population is densest along the river-valleys and on the coast.

RIVERS AND TOWNS OF THE PLAIN.

The Liffey rises in the Wicklow Mountains, and flows into Dublin Bay, which is overlooked by the bold promontory of Howth Head on the north, and by the Wicklow Mountains on the south.

Dublin, the capital of Ireland, stands near the mouth of the river, and is divided by it into a northern and southern portion, now linked together by many bridges. The city has many important public buildings, such as the Bank, which was used as the Irish House of Parliament till 1800 ; the Castle, which is the official residence of the Lord-Lieutenant ; a University and three cathedrals. The chief industries carried on are brewing and distilling, for which the water is suitable, and the manufacture of a material called ' poplin ' from silk and worsted. Ocean vessels can reach the harbour, though the mail-steamers stop at Kingstown.

Routes.—Dublin owes its chief importance to its good position on the east coast, at a point from which roads, railways, and canals could be easily constructed to diverge over the plain behind it. The Royal and Grand Canals, which connect the Liffey with the Shannon, are shown on p. 55. The four main railways which start from Dublin are the Great Northern to Belfast ; the Dublin and South-Eastern to Wicklow and Wexford ; the Midland Great Western to Galway, which sends a branch to the north from the market town of **Mullingar ;** and the Great Southern and Western line to Cork. The last-mentioned line has a branch to Kilkenny, and passes near Tipperary. **Kilkenny** stands on the Nore, and trades in the coal and black marble found in the district. **Tipperary** stands in a very fertile district called ' the Golden Vale,' and has therefore become a noted corn and butter market.

IRELAND: WATERWAYS.

The Boyne rises in the Bog of Allen, and has a somewhat sluggish course. **Drogheda,** near its mouth, has, like Dublin, grown up where the river was bridged in early times. It is a large port, trading chiefly with Liverpool, to which it exports live-stock and dairy produce. It has, too, mills for spinning flax and manufacturing linen. Similar trade and industries are carried on at **Dundalk,** north of Drogheda, and this town also manufactures engines for the Great Northern Railway, on which it stands.

The Shannon, not far from its source, passes through Lough Allen, and afterwards through Lough Ree and Lough Derg. These lakes are shallow, and the river has a winding, sluggish course till it reaches some rapids at Castleconnel, north of Limerick. Below these it is swifter, and after passing Limerick enters its long estuary. It is the longest river in

the British Isles, and is navigable to Lough Allen, except where the rapids occur, and these can be avoided by means of a short canal. The river is rich in trout and salmon, and fishing is important at **Athlone.** This town stands on the river, where it is crossed by the Midland Great Western Railway south of Lough Ree, and is a military centre. **Limerick,** at the head of the estuary, is the chief port of West Ireland. It exports dairy produce and a large quantity of bacon, which is cured there. Its chief imports are wheat and maize, and it has large flour-mills. Some lace is still made by hand there, though less than formerly.

The Erne passes through the lakes which are named after it. The country west of it is hilly, but parts are fertile, so that **Sligo** has a large export trade in farm produce. It is also a fishing port. Along the western edge of the Central Plain lie the large shallow lakes of Conn, Mask, and Corrib. Lough Corrib is drained to the sea by the Corrib River, which is noted for salmon, and at its mouth stands **Galway.** This town exports farm produce, the black marble quarried in the district, and river and sea fish. At the entrance to Galway Bay are the Aran Islands, which support a sparse population.

WESTERN CONNAUGHT.

Scenery.—This is chiefly formed of granite and other crystalline rocks, and is mountainous. One group of rounded mountains in the south-west is known as the Twelve Pins of Connemara. On account of the damp climate, many of the mountains have slopes partly covered with bogs. These bogs have a blacker hue than those of the plain, but, like them, can be cut for peat. Now and then heavy rain causes a bog to burst through the matted vegetation of its surface, and then it flows down the slopes as a flood of liquid mud. With the exception of Clew Bay, the numerous inlets round the coast resemble the lochs of Western Scotland, and have been formed in the same way. Many tourists visit this region in summer on account of the grand coast scenery. The high cliffs of Achill Island are particularly famous.

Inhabitants.—As much of the land is barren, the inhabitants are few and poor. Some quarry the green marble found in parts of Connemara, and some catch fish, but the majority tend herds of small black cattle and horned sheep, and grow potatoes. Wool is spun and woven in some of the cottages. Many labourers go over to Great Britain every summer to earn money there, and return to Ireland for the winter.

NORTHERN IRELAND.

This consists of four mountainous areas, which are separated from each other by the Foyle, the Bann, which drains the shallow rectangular-shaped Lough Neagh, and the Lagan.

Donegal, in the west, is a similar area of crystalline rock and mountainous scenery to Connaught. Here, too, the inhabitants are poor and few, and chiefly occupied in farming, quarrying, fishing, and home industries. The coast is deeply indented between Donegal Bay and Lough Foyle, the chief inlet being Lough Swilly.

Londonderry.—The south of this county is occupied by the Sperrin Mountains, which lie between the Foyle and the Bann. The chief town, **Londonderry**, or Derry, as it is often called, stands at the head of sea navigation on the Foyle. The city occupies a commanding position on a hill, and forms a good centre for collecting the farm produce it exports. It has large linen-shirt factories. **Moville,** on the north shore of Lough Foyle, is a calling-place for American steamers.

The Plateau of Antrim consists of basalt, similar to that of Skye and Mull, and owes its origin to the same cause. Near the coast the basalt in cooling formed wonderful columns, as at Staffa, and thus a natural pier has been created, which is called the '**Giant's Causeway.**' Fair Head and other parts of the coast exhibit the same striking structure.

The linen industry has become established in most of the large towns of North-East Ireland. This industry owes much of its prosperity to the fact that the water and climate here are so suitable for bleaching—*i.e.*, for rendering the linen white. Some of the flax required is grown in North Ireland, but most is imported from Russia and Belgium. Coal, too, has to be imported, for only a very little is found in Antrim and west of Lough Neagh, but it can be easily brought from the fields of Scotland, Cumberland, and Lancashire. Belfast has become the centre of the linen industry, and exports a great deal of linen to Liverpool.

Belfast stands at the mouth of the Lagan, where it flows into Belfast Lough. It has an excellent harbour, and good communication by railway and canal with other towns. It has many large factories for manufacturing linen, for bleaching and dyeing goods, and for making mineral waters, besides flour-mills, tobacco-mills, and breweries. Ship-building is also a very important industry, but iron has to be imported from Scotland and Barrow to supplement the little found in Antrim.

In connection with this industry others have been started for making engines, boilers, ropes, and sailcloth. Thus Belfast has grown to be the largest city in Ireland. North of Belfast is **Larne,** the packet station for Stranraer, in Scotland.

Down.—The coast of this county is broken by the large inlet of Strangford Lough, which is too shallow for large vessels. In the south of Down lie the Mourne Mountains, which are mainly composed of granite. The granite is quarried, and then polished at **Newry,** from whence it is exported, as the town stands on the Newry Canal at the head of sea navigation. The estuary of the Newry River is known as Carlingford Lough, and from Greenore, at its entrance, there are regular steamers to Holyhead.

SOUTH-EASTERN IRELAND.

This region consists of the Wicklow Mountains in the north, and in the south of hilly districts, separated by the valleys of the Slaney, Barrow, Nore, and Suir. The Wicklow Mountains are noted for the beauty of the deep wooded glens among them, one of which—the valley of the Avoca River—is particularly noted. The mountains consist partly of granite, which is quarried. The Slaney, which rises in these mountains, flows into Wexford Harbour. **Wexford** exports farm produce, and is a fishing station. Large vessels use the deeper harbour at **Rosslare,** the packet station for steamers from Fishguard.

The Barrow and the Suir unite and flow into the estuary called Waterford Harbour, after the town near the mouth. **Waterford** exports the live-stock reared in the river-basin behind, and the bacon, butter, and flour prepared in the town and neighbourhood. The word 'ford' in the names of Wexford and Waterford is a contraction of 'fiord,' and was given to those inlets by the Danes, who recognized that they were similar to the fiords of Scandinavia.

SOUTH-WESTERN IRELAND.

The Southern Valleys of Ireland exhibit a curious parallelism, and are separated by the Knockmealdown and other ranges which have a generally east-to-west direction. The rivers Bandon, Lee, and Blackwater, which, like the Suir, flow eastwards along these parallel valleys in their upper courses, finally turn sharply southwards through gaps in the ranges, and enter the estuaries which form the harbours of **Kinsale, Cork,** and **Youghal.**

Cork Harbour is a magnificent sheet of sheltered water. On one of the islands in it stands Queenstown, the port of call for steamers plying between Liverpool and America, unless they call instead at Fishguard. Cork stands at the head of navigation on the Lee, and is a great port. Its chief exports are cattle, grain, and butter, for which last it is particularly noted. Its chief industries, besides butter-making, are brewing, distilling, tanning, milling, and bacon-curing. It is the third largest town in Ireland.

THE BRITISH ISLES: DISTRIBUTION OF CATTLE.

Kerry and the Western Coast.—This area consists of mountainous peninsulas separated by long parallel inlets, running from south-west to north-east. The inlets of Dingle Bay, Kenmare River, and Bantry Bay owe their origin to the submergence of river-valleys, and their names to small ports on their shores. Several islands lie scattered off the rugged coast, and from one of these, **Valentia,** telegraph cables have been laid under the sea to America.

The Lakes of Killarney.—A small river, which rises in the Macgillycuddy's Reeks and flows into Dingle Bay, passes through three beautiful lakes, called, after the town near them, Killarney. The shores of the lakes are well wooded, and the Lower Lake, which is the largest, is studded with islands. A little to the west lies Carntual, one of the peaks in the Macgillycuddy's Reeks, and the highest mountain in Ireland (3,400 feet). Many tourists visit Killarney as well as the picturesque coast, so that a good many people in this region earn a livelihood as hotel-keepers, guides, and boatmen, etc. Others tend herds of the small black Kerry cows and catch fish.

THE BRITISH ISLES—REVISION.

THE GEOLOGICAL STRUCTURE OF THE LAND.

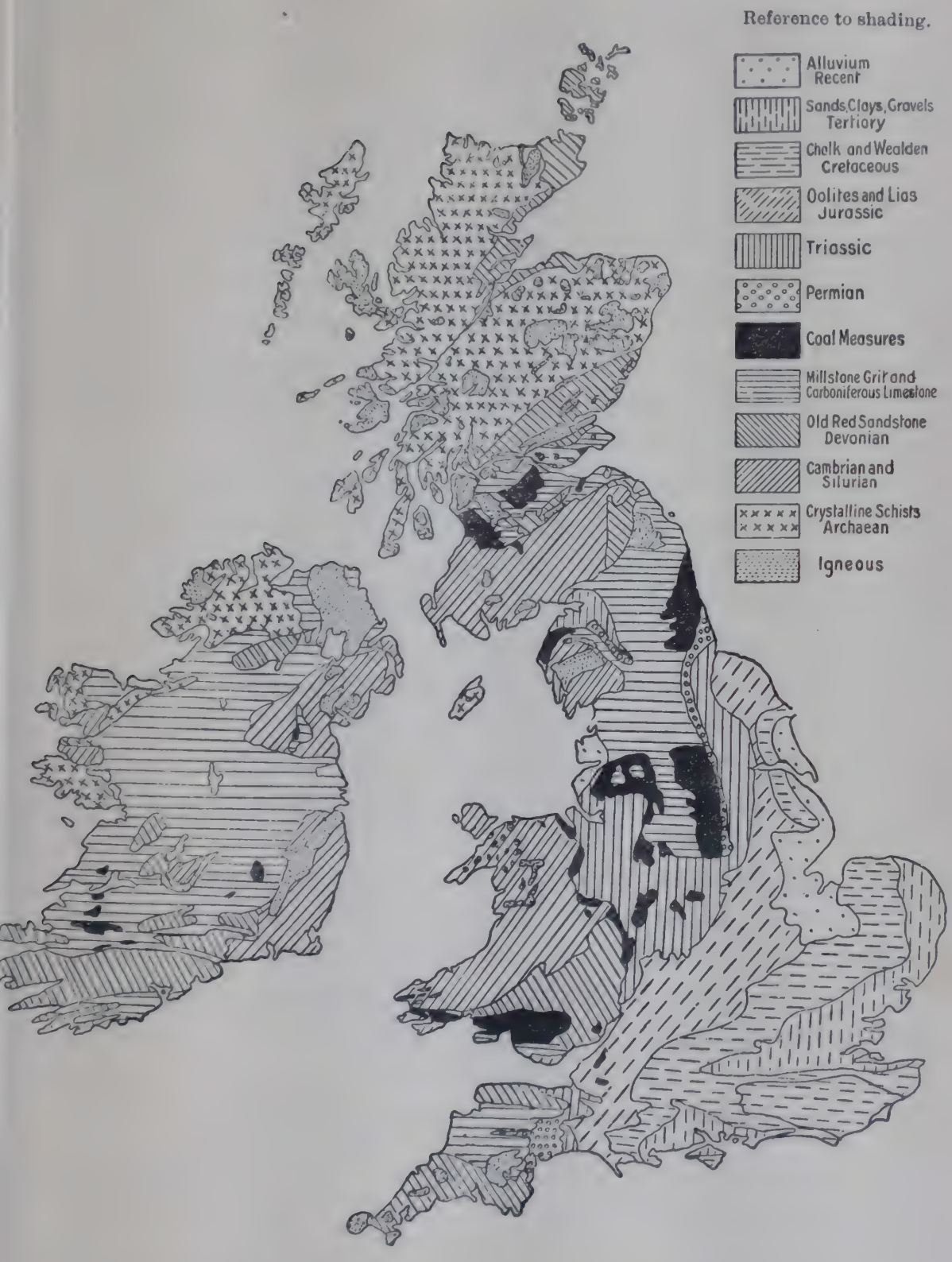
Rocks.—What we call soil is only decomposed rocks, often mixed with decayed vegetable and animal matter, and underneath soil there is always solid rock. Rocks are broadly classified into Igneous, Sedimentary, and Metamorphic. **Igneous rocks** must have once been in a molten condition, due to great heat.

Sedimentary rocks are composed of sand and mud deposited by water, just as sediment settles at the bottom of a glass of muddy water, and then consolidated by pressure. The hardened layers of mud or sand thus formed are called 'strata,' and sedimentary rocks are sometimes called 'stratified rocks,' whereas igneous rocks are unstratified. Limestone, sandstone, and chalk are common sedimentary rocks.

Metamorphic rocks are such as were originally formed by deposition in water, but were afterwards greatly altered by heat and pressure. Of this nature are various schists, which, like the igneous rocks, have a crystalline appearance, and marble, which was formerly limestone.

The Age of Rocks.—Some millions of years must have been required for the formation of many of the sedimentary rocks, for deposition is a slow process, and the beds of rock are in some cases several thousand feet in thickness. Long intervals must also have occurred between the formation of one bed of rock and the deposition of another, during which land was elevated, altered, and then depressed or worn down to sea-level. Geologists do not, in fact, attempt to state definitely in years the age of the different beds of rock, but they have been able to determine their comparative age by means of the nature of the remains or impressions of plants, shells, fishes, and animals of former times found in them. These impressions, called 'fossils,' are of very simple forms of life in the older rocks, and are more like those that exist to-day in the recent rocks. No fossils are found in igneous rocks. Igneous rocks may be of any age, and through the action of volcanoes are in some places being formed on the earth's surface to-day; but the oldest rocks are igneous or metamorphic.

The sedimentary rocks were laid down horizontally in the order shown on p. 61 on the original igneous rocks, and it is owing to the tilting of the whole series of rocks, and to their having undergone various degrees of destruction, that we now find such a variety at the surface.



GEOLOGICAL MAP OF THE BRITISH ISLES. (After Bartholomew.)

The key to the map shows the sequence of the rocks, the oldest being archæan and the youngest alluvium.

British Rocks and Scenery.—Each kind of rock may form many varieties of scenery, but in Great Britain we can broadly associate the plains with alluvial deposits and districts composed of clay, gravel, and sand; the hills with chalk and oolitic limestone; and the mountains with the older and harder sedimentary rocks, as well as with metamorphic and igneous rocks. (See maps on pp. 15, 19, and 41.)

Soft Rocks.—The alluvial deposits correspond to the lowest and flattest districts. The areas of sand and gravel are more likely to have a varied relief than those of clay, for water sinks through them without modifying their surfaces so much as in the case of the non-porous clay. Clay, too, tends when wet to slip, and so to reduce elevations. Round London there are several small hills capped with sand or gravel, while the lower areas consist of clay or alluvium.

Chalk and Limestone.—The chief characteristics of our chalk-lands are the rounded forms of the hills, the absence of streams—for chalk is porous—the good pastures they afford, and the white cliffs they form along our coasts. Carboniferous limestone is also often associated with dry stream beds and underground caves, for water percolates down through cracks in it. It, too, makes good grassland, but it is harder than chalk, and mountains of it are less rounded and more like plateaus trenched in places by deep ravines. (See pp. 24 and 46.)

Millstone Grit, Granite and other crystalline rocks form our moorlands, for they yield but poor soil. Granite sometimes assumes a tower-like appearance, as in the tors of Dartmoor, but in other places forms massive rounded mountains. It easily decays, and thus bogs are formed, while its non-porous character renders streams numerous and clear. The red colour of some kinds of granite and of some sandstones add considerably to the beauty of scenery.

THE SCULPTURING OF THE LAND.

The forces which act from within the earth, and cause upheavals from time to time, although very powerful, are not so important in determining the present aspect of the land as the external forces of temperature, water, wind, and ice, together with that of gravity, which tends to make everything descend to the lowest level.

Temperature.—Heat causes rock to expand and cold to contract, and these changes promote the formation of cracks, which may be widened by the action of water or frost. Fragments will in

time break off, and these will be rubbed against each other, and against the solid rock, by the wind, or in process of rolling down a slope. They will by these means grind off other rock particles, and become smaller in size themselves.

Ice destroys land by grinding the rocks over which it moves, and the great glaciers which long ago passed over much of Ireland and of Great Britain north of the Thames have left traces of their work in the rounded and polished nature of the rocks that lay in their paths, as well as in the huge blocks of stone, called 'boulders,' which rolled down on their moving surfaces and were transported, till the ice melted and they were necessarily dropped. The clay known as 'Boulder clay,' which is especially common in Eastern England, is also a glacial deposit.

Water is, however, the most common and destructive of all the external forces. It acts on the surface of the land in the form of rain and rivers, while the sea attacks the coast, so that certain parts of the earth's crust are being constantly dissolved or washed away, while others remain, and form ranges and promontories. Water always contains carbonic acid gas and various impurities, which act chemically on some kinds of rock and dissolve them, but the chief way in which it destroys the land is by washing stones and rock-particles into the rivers, the motion of which causes them to tear away the banks, and to grind against each other till they reach the sea in the form of mud and sand. The silt deposited by a river in its valley, or as a delta at its mouth, forms what is called 'alluvial' soil, and this is often very fertile, as it consists of a great variety of rock-particles all ground small together.

The sea erodes * the coast, largely with the aid of the stones that it dashes against it, while these in the process are rounded into pebbles or pounded into sand or mud. Since the softer layers of rock and those within easy reach of the waves will be most easily eroded, cliffs are liable to be under-cut, and caves and arches are formed, till some day a landslip occurs, and part of the coast falls into the sea. In some places the sea is depositing material, and thus forming shingle promontories, as at Dungeness, or filling up bays, but, on the whole, the sea and rivers destroy far more than they create; in fact, if upheaval does not occur the British Isles will in time be covered by the sea, as they have been on several occasions in the long past.

* The words 'erode' and 'erosion' are derived from a Latin word which literally means the act of gnawing away.

RELIEF AND RIVER SYSTEM.

Highlands and Ranges.—The areas of highest land in the United Kingdom are: (1) The Highlands of Scotland; (2) The Scottish Uplands and Cheviot Hills; (3) The Pennines; (4) The Cumbrian Group; (5) The Welsh Uplands; (6) The mountains of Cornwall and Devon; (7) The mountains of Ireland, which chiefly lie near the coast. South-Eastern England is crossed by a belt of hills composed of oolitic rocks and by ranges formed of chalk—*i.e.*, Cotswold Hills, Edge Hill, and Lincoln Edge. (See pp. 35 and 41.)

Plains.—The only large areas of lowland are: (1) The Central Plain of Scotland; (2) The Midland Plain of England; (3) The East Anglian Plain and Lower Thames Valley; (4) The Central Plain of Ireland, which reaches the east coast north of Dublin.

River System.—The chief water-parting or divide of Scotland runs from north to south, but nearer the west coast than the east. This divide continues southwards through England along the Pennines and across the Midland Plain. It then turns south-westward along the Cotswold Hills, and through Devon and Cornwall. An important branch divide runs eastwards across Southern England and through the Weald. Most of the Welsh rivers rise in the west, as well as the Severn. In Ireland the rivers rise in the Central Plain, and flow in all directions.

The longest rivers are the Shannon, 225 miles; the Severn, 240 miles; the Thames, 215 miles; and the Yorkshire Ouse, Great Ouse, and Clyde, all about 150 miles.

CLIMATE AND VEGETATION.

The United Kingdom can be divided into the following climatic areas*:

1. **The highlands and ranges of the North and West** of Great Britain, and large areas in Ireland, which have a cool equable temperature, and are moist and cloudy. These areas are mainly bog, moor, or barren wastes, though in parts covered with poor grass.

2. **The lowlands of the North and West** of Great Britain and the rest of Ireland, which are also equable, moist, and cloudy, but warmer than the highlands. These form good pasture-lands, and are suited for such crops as oats, potatoes, and turnips.

3. **The hills and plains of Central, Eastern and Southern**

* For maps, see p. 8, and for statistics, p. 338.

England, which are drier and more sunny than the other regions, and in the east and centre suffer greater extremes of temperature. In the south the winters are generally mild. These, too, form good pasture-lands, but large areas are devoted to growing wheat, barley, root-crops, vegetables, and fruit. Hops are also grown in Kent, Surrey, Hereford, and Worcestershire. The total crop of wheat amounts to about one-fifth of the amount required.

Forests.—Formerly much of our country was covered with forests, but now there only remain such patches as the New Forest, in Hampshire; the Forest of Dean, in Gloucestershire, and Epping Forest, east of London.

THE BRITISH ISLES: WHEAT-GROWING AREAS.

USEFUL ANIMALS.

Live-Stock.—The districts devoted to cattle will be seen from the map on p. 59 to be those where a heavy rainfall creates rich pasturage. Sheep and ponies are reared chiefly on the mountains of Scotland, Wales, North England, and Devon, as well as on the hills of South-East England—wherever, in fact, cultivation is difficult. Horses are chiefly reared in the Vale of Yorkshire, the Wash Basin, the Valley of the Clyde, and in Ireland. Pigs are very numerous in Ireland, and the country is also noted for poultry.

Fish.—The sea-fisheries round our shores are very valuable, but river-fish, save salmon and trout, chiefly caught in certain Scotch and Irish rivers, are not very important. The shallow waters round the Dogger Bank in the North Sea are particularly rich in cod and in flat-fish, such as plaice, sole, turbot, etc. Herring are caught all round the coast, for they migrate from the North, where they are found in summer, to the

English Channel, where they appear in winter. Mackerel are also widely distributed, while pilchards are chiefly found off the Cornish peninsula, and haddock off the east coast of Scotland. Oysters are mainly reared off the coasts of Kent and Essex.

USEFUL MINERALS AND METALS.

Building Materials.—Many of the harder rocks found in the north and west are quarried for building purposes, while the clays of Central and South-East England are used in many parts for bricks. Slates are quarried in North Wales, parts of Scotland, and Cumberland. The most valuable ornamental stones are marble, found in Derbyshire and parts of Ireland, and granite, which is mainly obtained from Scotland, near Aberdeen and Peterhead, Cumberland, the Cornish peninsula, and parts of Ireland.

Coal.—This is generally called a mineral, but is really composed of decayed vegetable matter which was hardened by pressure long ago. The chief coal-fields in order of production in 1910 were: (1) The Yorkshire, Derby, and Nottingham; (2) Northumberland and Durham; (3) South Wales and Monmouthshire; (4) Scottish; (5) South Lancashire; (6) North Staffordshire. There are also small fields in the Midlands, Cumberland, North Wales, near Bristol, in Gloucestershire, and in Ireland (see pp. 57 and 61). **Oil-shale** is obtained in Fife and near Edinburgh.

Iron.—Nearly two-thirds of the value of all the iron mined in this country is obtained in the Cleveland district of North Yorkshire, in parts of South-West Cumberland, and in North Lancashire around Barrow. Other important deposits occur in the Scottish Plain and in North Staffordshire, but those that remain around Birmingham and in South Wales are hardly considered to be worth working at present.

Salt is mainly obtained from mines in Cheshire, Worcestershire, and Durham. **Tin** is still obtained in Cornwall and Devon, but the copper mines there are practically exhausted. Some **lead** is mined in the Isle of Man, and a little **zinc** in Wales.

POPULATION.*

The British Isles can be broadly divided into the following areas, according to the density of the population (see p. 67): (1) The Highlands and Southern Uplands of Scotland; the Cheviots, Pennines, and Cumbrian group in England; the Uplands of Wales; the English hills; the moun-

* For statistics *re* population, see p. 347.

THE BRITISH ISLES: DISTRIBUTION OF POPULATION.

tains and bogs of Ireland. In all these areas the population is sparse, and in some very sparse. (2) The Lowland Plain of Scotland; the coal-fields and their vicinities in England and Wales; and the London area, where population is very dense. (3) The remaining lowland areas in all the countries where population is fairly dense.

The majority of the inhabitants of Southern Scotland, England, and North-East Ireland are descended from races which are called Teutonic, and in our country speak English; but the Highlanders, Welsh, and inhabitants of most of Ireland, are descended from Celtic races, and some speak Celtic languages. These Celtic languages are, however, now used commonly only in rural districts, and many who would naturally speak them can also speak English.

THE GROWTH OF TOWNS.

In former days towns were often built in places which afforded natural facilities for defence, such as on hill-tops, peninsulas, small islands and districts surrounded by marshes.

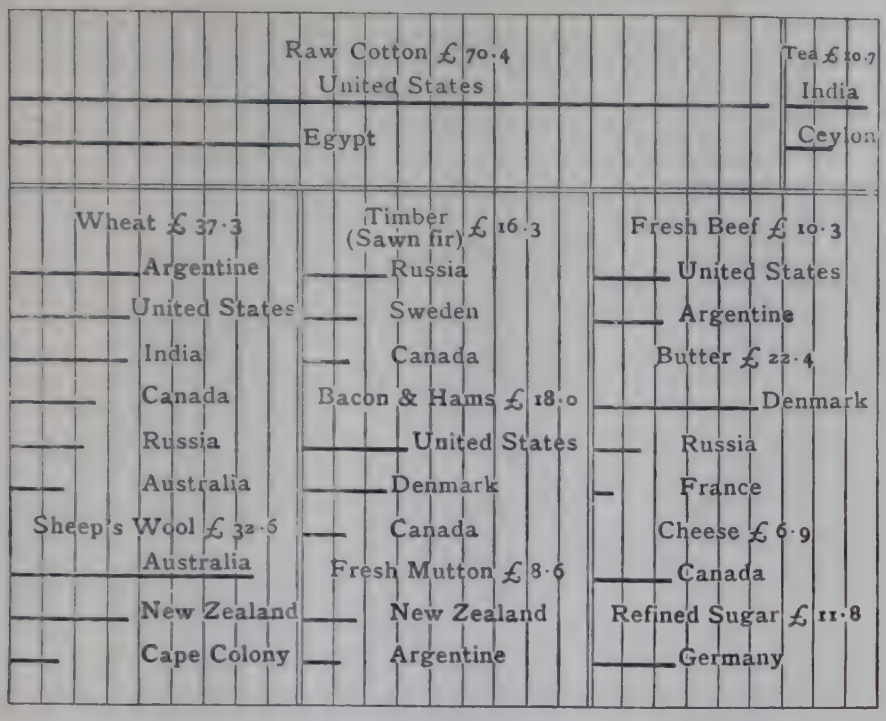
Trading Centres and Ports.—Another consideration influencing men in the choice of a site for a town, and one which is, perhaps, now of most importance for its growth, is suitability for trade. Towns, for example, which are situated where a river is bridged, or where a river receives a navigable tributary, are likely to become centres of traffic. So, too, with towns situated at the entrance to a pass across a range, or meeting-place of valley routes in a hilly district. Many towns also flourish which stand on rivers at the head of navigation for barges, sea-vessels, or ocean steamers, for at all these points goods have to be conveyed from larger to smaller vessels, or to land vehicles. The position of ports which are not on rivers is naturally largely determined by the nature of the coast which influences the depth and safety of their harbours, but the value of their trade is now mainly dependent on the wealth of their hinterlands—*i.e.*, the regions behind them, to which they send the bulk of their imports, and from which they receive the bulk of their exports.

Other considerations which have influenced the sites of towns are a good water-supply, waterfalls which can be used as a source of power, the mineral resources of a district, salubrity, and scenery.

COMMERCE.

The chief imports of Britain are food products and raw materials. By far the most important are grain and flour, raw cotton, and meat. Others, in approximate order of value, are butter and margarine; timber; sugar; flax, hemp, and jute; silk manufactures; copper and copper manufactures; tea; chemicals; fruit and hops; woollen manufactures and yarn; oil-seeds; leather, etc.

The chief exports of Britain are manufactured goods, coal, and iron. In approximate order of value they are: cotton manufactures and yarn; iron, steel, and manufactures of the same; coal; woollen and worsted manufactures and yarn; chemicals, drugs, and dyes; apparel and haberdashery; linen and yarn, etc. We also export many goods in the same condition as we import them. This is called **entrepôt trade,** and is partly due to the facilities we have for shipping.



COUNTRIES FROM WHICH SOME OF OUR IMPORTS WERE DERIVED IN 1907.
The difference between the vertical lines represent two million pounds in value. The value of the total import is stated after the import in million pounds.

Of our imports nearly a quarter come from British possessions, and nearly another quarter from the United States. The rest of our imports come mainly from European countries, or outside Europe, from Egypt and the Argentine.

Of our exports, about a third go to our possessions and another third to European countries. We also send a good many to the United States, and the rest are widely distributed over the world.

Reasons for the Magnitude of our Trade.—The value of our trade is more than that of any other country, and its importance is due to the fact that we produce much and consume much. It is great also because we can very easily import and export goods on account of the following advantages: the position of our country, near to the great commercial nations on the mainland of Europe, and in easy communication with America; the nearness of every place in the kingdom to the coast, and sometimes to more than one coast; our good roads, numerous railways, canals, and navigable rivers; and our many good harbours (see pp. 19 and 51). Many of our seaports have a depth of 25 feet at high water, and some more than this, and thus they are suited for very large vessels. The chief ports in order of the tonnage entered and cleared are London, Liverpool, Cardiff, the Tyne ports, Hull, Dover, Glasgow, and Southampton.

EUROPE: POLITICAL.

D = Denmark; H = Holland; B = Belgium; S = Switzerland; M = Montenegro.

THE MAINLAND OF NORTH-WEST EUROPE.

FRANCE.

Boundaries and Relief.—France touches the English Channel, the Bay of Biscay, and the Mediterranean Sea. It is separated from Spain by the Pyrenees, from Italy by the Alps, from Switzerland by the Jura, and from Germany by the Vosges. Farther north the frontier between France and Germany and Belgium is purely artificial. The interior of France consists of a Central Plateau and a ring of lowland, which is broadest in the north. The Central Plateau is highest in the south-east, if we except some of the peaks of the Auvergne Mountains in the centre. This south-east margin is known as the Cevennes, while a north-eastern extension of the plateau is called the Côte d'Or Range and Plateau of Langres. The natural regions into which France can be divided are shown on p. 73.

FRANCE: POLITICAL.

NORTHERN FRANCE.

1. **The Basin of the Upper and Middle Seine.**—The land here is rather flat, but dips slightly in the middle, so that the Upper Seine, Yonne, Marne, and Oise flow down towards the centre. The margin of the basin is highest in the south-east, where lie the Côte d'Or and Plateau of Langres, in which the Seine and most of the tributaries rise. The wide expanse of nearly level cultivated land which forms the basin has a somewhat monotonous aspect, for the fields are rarely divided by hedges, though the straight roads are often flanked by poplars. The soil, however, is fertile, and much wheat is grown there.

Paris.—The capital of France has naturally arisen in the midst of this productive area, and at the best centre of the system of waterways formed by the Seine and its tributaries. The exact situation of the city

FRANCE: RELIEF AND RAILWAYS.

was determined by the presence of an island in the Seine, which could easily be defended in olden times. On this island stands the Cathedral of Paris; but the city has long ago spread beyond the island to the banks on each side, which are connected by many bridges. Small sea-vessels can reach Paris, and the trade of its port is considerable; but it is not a great manufacturing town, and suffers from lack of coal in the vicinity. Its chief manufactures are articles of fashion, as millinery, jewellery, and gloves. The city is famous, however, for its University, picture-galleries, and the facilities it affords for the study of art and music. From Paris railways radiate in all directions.

2. **The Lower Seine and Normandy.**—One line follows the Seine to Rouen, near its mouth, and goes on to Havre, north of its estuary. **Rouen** is a picturesque old city, which has developed an important cotton industry, though coal has to be imported from abroad, or brought from the coal-field of the north-east. Some cotton is brought direct from the United States to Rouen, but very large vessels unload at the deeper port of **Havre.** Rouen is the capital of Normandy—a province which extends a little to the east of the Seine, and westward to include the

FRANCE: NATURAL REGIONS.

The parts left white are relatively low.

peninsula which juts northward. Many apples are grown here for making cider, and the district is noted for dairy produce.

3. **The North-Eastern Margin of the Seine Basin.**—This area is crossed by low hills in the north, composed of chalk, which form white cliffs at intervals along the coast between Calais and Dieppe. Much of the coast is, however, low and sandy. Constant packet steamers go regularly from **Calais** to Dover in about an hour, from **Boulogne** to Folkestone in about an hour and a quarter, and from **Dieppe** to Newhaven in about four hours. **Dunkirk** is an important port.

The continuation of the Belgian coal-field into North France has made the region near the frontier the largest industrial area in the country. It is chiefly devoted to the manufacture of textiles. The woollen industry has been helped by the rearing of sheep on the chalk hills, though much foreign wool to supplement the home supply is now imported at Dunkirk and Havre. The chief towns for manufacturing wool are **Roubaix, Reims,** and **Amiens.** The two last towns have noted cathedrals. The linen industry has been aided by the cultivation of flax in the district around **Lille** and Cambrai, where it is carried on,

as well as in the adjoining parts of Belgium. Lille also carries on cotton and woollen industries.

The kind of beetroot from which sugar is obtained is grown extensively in the north and south of Reims (see p. 328). The vine is largely cultivated for wine (see p. 330). Reims has, in fact, an important trade in wine, and the province of Champagne in which it stands has given its name to a noted kind of wine. The towns at the base of the Vosges are engaged chiefly in manufacturing cotton, and largely employ water-power for this purpose. The best supplies of iron in the country are found around **Nancy**, on the Moselle, which has large iron-works.

4. **The Middle Basin of the Loire.**—The Loire is too rapid a river, and varies too much in depth at different seasons, to be of much use for navigation; but it is connected with the Seine by a canal from **Orleans,** which stands at the bend of the river. The district around the Loire on the west of Orleans produces much wheat and wine. In former times many of the great nobles of France built beautiful castles for themselves on the Middle Loire and its tributaries.

WESTERN AND CENTRAL FRANCE.

Western France consists of two peninsulas—one called Cotentin, which juts northwards and forms the western portion of Normandy, and one jutting westward, which is the province of Brittany. **Brittany** is hilly, and composed of hard crystalline rocks, which yield poor soil. A large part is covered with gorse and poor grass. The climate is mild, moist, and subject to fogs. Many of the inhabitants live by sardine and oyster fisheries off the rocky coast. The people, who are called Bretons, are mainly of Celtic origin, and their language is quite different from French. They are descended from tribes who were driven out of Britain long ago by the Anglo-Saxons, and sought refuge in this region, which has therefore been called Brittany. The chief towns in the Western Region are the naval stations of **Cherbourg, Brest,** and **Lorient,** and the port of **Nantes,** at the mouth of the Loire. The outport of Nantes, St. Nazaire, can accommodate the largest vessels, and ships of fair size can reach Nantes by a ship-canal.

The Central Plateau.—This slopes from its high south-eastern margin, which is known as the Cevennes, towards the north-west, but in the middle, in Auvergne, there is a group of extinct volcanoes. The stumps of these old volcanoes are called 'puys,' and in some cases the

craters are still visible at their tops, though in most their shape has been much altered by weathering. The volcanic soil which has been washed down into the valleys of the Upper Loire and Allier is fertile, and the valleys are therefore cultivated. The granite and crystalline rocks of the plateau outside the volcanic area is, however, infertile, and as the climate is cool and moist the area is mainly a poor pasture-land for cattle, sheep, and goats. Some parts are devoted to plantations of trees, for the French depend a good deal on wood for fuel, not having enough coal. Coal-fields occur, however, round Creuzot, where a little iron is also found and manufactured, and round **St. Etienne**. St. Etienne, too, has iron-works, but is chiefly noted for its ribbon industry, as it can easily obtain silk from the Rhone Valley, and has good water for dyeing purposes. The kaolin found near Limoges has fostered a porcelain industry there.

SOUTHERN FRANCE.

The South-Western Region consists mainly of the basins of the Garonne and Dordogne. The Garonne rises in the Pyrenees, but its right bank tributaries derive their waters from the Central Plateau, and the Lot and the Tarn have cut deep cañons in a limestone district through which they pass. The Dordogne, which also rises on the plateau, only joins the Garonne in the estuary called the Gironde. The most noted product of the district is wine, which is largely exported from **Bordeaux,** situated on the Garonne, above the head of the estuary. Brandy is made at Cognac, farther north. Wheat and tobacco are grown in the Garonne basin, and there are tobacco factories at **Toulouse,** on the bend of the Upper Garonne. Toulouse has easy communication with Eastern France by the railways and Canal du Midi, which lead from it through the gap between the Pyrenees and Cevennes.

The Landes.—South of the Gironde stretch the Landes—a low-lying, sandy district, with harbourless coast. Near the coast are sand-dunes, marshes, and shallow lagoons. Further east the sands are over-grown by coarse grass, on which sheep, pigs, and geese are reared, and still farther inland pine-woods have been planted to try and check the inroads of the sand.

The South-Eastern Region: 1. The Basin of the Saône.—The Saône is navigable for most of its course, as well as its tributary, the Doubs. Its basin is flanked by the Central Plateau, Côte d'Or, Langres Plateau, and Jura. On the southern slopes of the Côte d'Or the vine is

grown, and **Dijon** is a great centre of the wine industry. The town stands on the railway from Paris to Marseilles, which carries an enormous amount of traffic. This line was taken through Dijon, instead of by a more direct route, in order to avoid crossing the Central Plateau, but even then tunnels were required through the Côte d'Or Range.

2. **The Basin of the Lower Rhone.**—The Rhone rises on Mont St. Gothard in Switzerland, and flows through the Lake of Geneva before it enters France and joins the Saône at Lyons. **Lyons** is the centre of the silk industry in France, for mulberry-trees, on which silkworms are fed, are grown in the Lower Rhone Valley, and coal can be obtained from the St. Etienne field. The water of the Rhone is, moreover, suited for dyeing the silk. The silk industry is also carried on at Avignon, on the Rhone near the confluence of the Durance, and at Nîmes ,to the west. The southern latitude of the Lower Rhone Valley, and its sheltered position between the Alps and Cevennes, has promoted a warm, sunny, and rather dry climate of the Mediterranean type, well suited for olive-trees.

The Rhone is a rapid river, with sand-banks in its lower course, which somewhat impede navigation. The amount of silt it and its Alpine tributaries bring down has formed a large delta, where it enters the almost tideless Mediterranean Sea. On account of this sediment, and the fact that a current sweeps it westward, the great port of **Marseilles** has been placed to the east of the delta, so that its harbour may not be silted up. Marseilles carries on an enormous trade with other Mediterranean ports, and with Southern Asia by way of the Suez Canal. Though it has no near rivals, it has felt the competition of Genoa, but is still the largest French town after Paris. Among its industries is the manufacture of soap, which is fostered by the good local supply of olive-oil.

3. **The Mediterranean Seaboard** west of Marseilles is marshy, and studded with lagoons, called 'étangs.' East of Marseilles it is extremely picturesque, and warm enough for even oranges and lemons in parts. The strip of land between the Alps and the sea is known as the **Riviera**; and in winter many visitors resort to **Nice** and other towns here. **Toulon** is a naval station.

COMMERCE.

Railways.—France has an excellent railway system, although the Central Plateau has hindered easy direct communication in certain directions, and forced the great streams of traffic to go round it (see p. 72)

FRANCE: WATERWAYS.

It is also well connected with surrounding countries, despite its mountainous frontiers. With Spain it is linked by two railways, which run east and west of the Pyrenees, though the width of the gauge of the line changes at the frontier. Italy can be reached by the railway along the Riviera coast, and another line which passes through the Mont Cenis Tunnel to Turin; while leading into Switzerland there is a line following the Rhone Valley to Geneva, another which crosses the Jura and goes to Lausanne, and a third to Basle, which utilizes the gap between the Jura and the Vosges. This gap is called the 'Gate of Burgundy,' because the Teutonic tribe called the Burgundians entered the Rhone Valley by it in the fifth century. The Vosges Mountains are crossed by a railway over the Zabern Pass to Strassburg, in Germany. Farther north the line from Paris to Cologne, on the Rhine, skirts the northern base of the Ardennes, and many lines cross the northern plain into Belgium.

Navigable Waterways.—France has a splendid system of waterways. The navigable portions of the rivers and the canals which connect them are shown on p. 77. The rivers of most use for navigation are the Seine and Saône, and the most important canals are the Canal du Centre, which unites the Loire and Saône; the Burgundy Canal, between the Yonne and Saône; the canal which links the Marne to the Rhine via Strassburg; and the canals between North France and Belgium.

Ports.—The chief ports of France in order of the value of their trade are Marseilles, Havre, Paris, Dunkirk, Bordeaux, Boulogne, Calais, Rouen, and Dieppe. **The chief exports** in order of value are silk textiles, cotton textiles, raw wool, woollen textiles, wine, and raw silk.

ALPINELAND.

Alpineland covers an area nearly equal to Great Britain. It extends in a sickle-like form from a point north of Genoa, where it merges into the Apennines, to one almost due south of Vienna, where it is very broad, and whence it merges southward into the Dinaric Alps, which flank the Adriatic Sea. Alpineland consists of many ranges, which are arranged for the most part in parallel lines, and are separated by deep longitudinal valleys, having a general east-to-west direction. Fortunately for commerce, there are some transverse valleys, and often passes, over the ranges uniting valleys on opposite sides. Many of the passes are, however, of considerable height.

Alpine Passes and Tunnels.—The lowest pass across the Alps is the Brenner Pass, over which an important road and railway have been made, though it is over 4,400 feet in height. The route over it leads from Innsbruck in Austria, to the valley of the Adige, and thence into Italy. Other important roads lead from Switzerland to Italy by the St. Gothard and Simplon Passes; and railways, after ascending some way, have been carried through these mountains by tunnels. The St. Gothard Tunnel is nearly 10 miles long, and the Simplon is over 12. Another tunnel, called Loetschberg, which is about 10 miles long, has recently been cut through the middle point of the Bernese Alps, just east of the Gemmi Pass, to facilitate access to the Simplon route. No railway yet follows the road over the Great St. Bernard Pass, but one has been carried from France through the Mont Cenis Tunnel into Italy.

Alpine Peaks.—The Alps rise very steeply from the plains of North Italy, and slope more gradually to the plateau of North Switzerland. The highest ranges lie in South Switzerland, and between France and Italy. Many of the Swiss peaks are over 13,000 feet high—*e.g.*, the Jungfrau and Finster-aar-horn, in the Bernese Alps north of the Rhone Valley, and Monte Rosa and the Matterhorn, in the Pennine Alps to the south. In France, and at the western end of the latter range, is situated Mont Blanc (15,800 feet), the highest mountain in Europe, excepting some peaks in the Caucasus Range. The summits of the high Alps are buried in snow all the year round, unless their peaks are too steep for snow to rest on them. The snow-line varies from 9,500 or 10,000 feet on the southern slopes to about 8,500 on the northern, but great glaciers descend the valleys to about 4,500 feet.

Glaciers are formed of the snow on the high mountains which has been compressed into névé and then into ice by the weight of fresh snow above, and is forced down the valleys. These glaciers only move, on the average, about a foot a day. Finally they reach the lower valleys, where the air is warm enough to convert them into streams of water. The longest glacier in Switzerland, south of the Jungfrau, is about 16 miles long. The surface of the glaciers is often rent by deep cracks, called **crevasses,** which are generally caused by the fact that the ice moves more rapidly in some parts than in others. The glaciers are also disfigured along their sides by the piles of earth and stones which have fallen down from the slopes which border them, and are called **lateral moraines.** The beds of the glaciers, and the stones they bring with them, show signs of being scratched and polished by the action of the ice. At the end of the glaciers, the rubbish they bring down forms **terminal moraines,** and streams which rise in glaciers are often of a grey colour, on account of the mud they carry away from these moraines. Very long ago much of Northern Europe was covered by an ice-sheet, and glaciers filled many valleys. Some of the valleys still show signs of the action of the glaciers in their scratched rocks and U-like shape, and are called 'glaciated valleys.'

Alpine Rivers.—The Alpine snows are like giant reservoirs, and give birth to such important rivers as the Rhine, Rhone, Po, and many tributaries of the Danube. The Rhine and Rhone, as well as many of the tributaries of the Rhine and Po, flow through lakes on the northern and southern margins of Alpineland. In these still waters is deposited

SWITZERLAND: POLITICAL AND ECONOMIC.

the sediment brought down by the rivers, so that they issue forth quite clear; and the lakes themselves are of a pure blue colour.

Alpine Vegetation.—Below the region of snow and bare rock which occupies the higher portions of Alpineland grow mosses and stunted bushes; and there are high pastures, to which cattle are taken in summer, when the grass in the lower valleys is required for hay. Still lower down stretch the forests, formed mainly of fir and pine trees, which furnish the common fuel in Alpineland, as well as the material for building the characteristic barns and cottages known as châlets. Below the pine-forests, and interspersed with beech-woods and walnut-trees, are more stretches of pasture-land, while on the lowest and sunniest Alpine slopes fruit-trees are grown and the vine flourishes.

The Population of Alpineland is naturally sparse, and is concentrated mainly in the river-valleys, especially in winter, when many of the hotels on the high mountain-slopes, to which tourists resort in summer, are closed.

SWITZERLAND.

Boundaries and Relief.—Switzerland occupies the central part of Alpineland, and touches Germany, France, Italy, and Austria. It

consists of a series of ranges and valleys in the south, and in the north of a plateau flanked by the Jura Mountains on the north-west.

The Southern Alpine Region.—The scenery of this region has been already described, and the peasants are occupied chiefly in tending cattle, keeping hotels, cutting timber, and sometimes in wood-carving. The chief river-valleys diverge from Mont St. Gothard, where rise the Rhone, Rhine, and Reuss; or from its neighbourhood, as those of the Aar and Ticino. These rivers are not navigable in Switzerland.

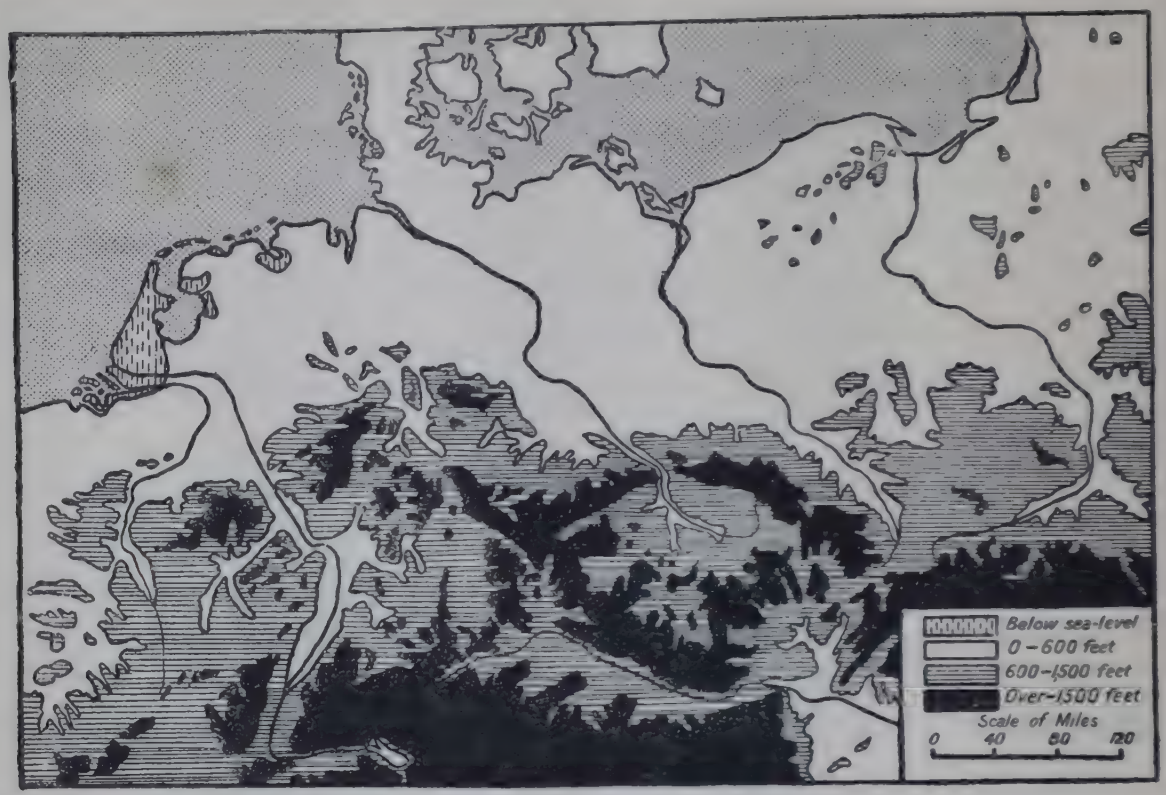
The Plateau of North Switzerland is mainly devoted to pasture-land for cattle, and much milk is condensed or made into cheese. All the large towns of Switzerland lie in this area, and three—*i.e.*, **Zürich, Geneva,** and **Lucerne**—stand on rivers at the spot where these leave the lakes named after the towns. As the rivers form rapids at these points, the towns enjoy water-power that can be used in manufactures and for other purposes. These towns also benefit by the purity of the water and by the local trade which can be carried on across the lakes by small steamers. Zürich has important cotton and silk industries, many of the cotton goods being embroidered at St. Gall before they are exported. Geneva manufactures watches, and Lucerne is a great resort for tourists. Many tourists also resort to **Berne,** the capital of Switzerland, on the Aar, and to Lausanne. **Basle,** which stands at the bend of the Rhine, has a silk industry, and is a great railway centre. Small boats can ascend the Rhine to this point. **The Jura Mountains** are not so high as the Alps, and are largely covered with forests. Many of the inhabitants are occupied in watch-making.

The chief exports of Switzerland are silk and cotton goods.

GERMANY.

Relief.—We can broadly divide Germany into a northern and eastern area, which forms part of the Great Plain of North Europe, and a western and southern area, which consists of plateaus and ranges. The Riesen Gebirge, Erz Gebirge, and Böhmer Wald * border Bohemia, and at the corner where the two last-mentioned ranges meet in the Fichtel Gebirge, the German Jura and Thuringian Forest diverge south-westwards and north-westwards. North of the Erz Gebirge the plateau of Saxony slopes towards the Great Plain. This plain is only relieved

* In English, the Giant Mountains, the Ore Mountains, and the Bohemian Forest.



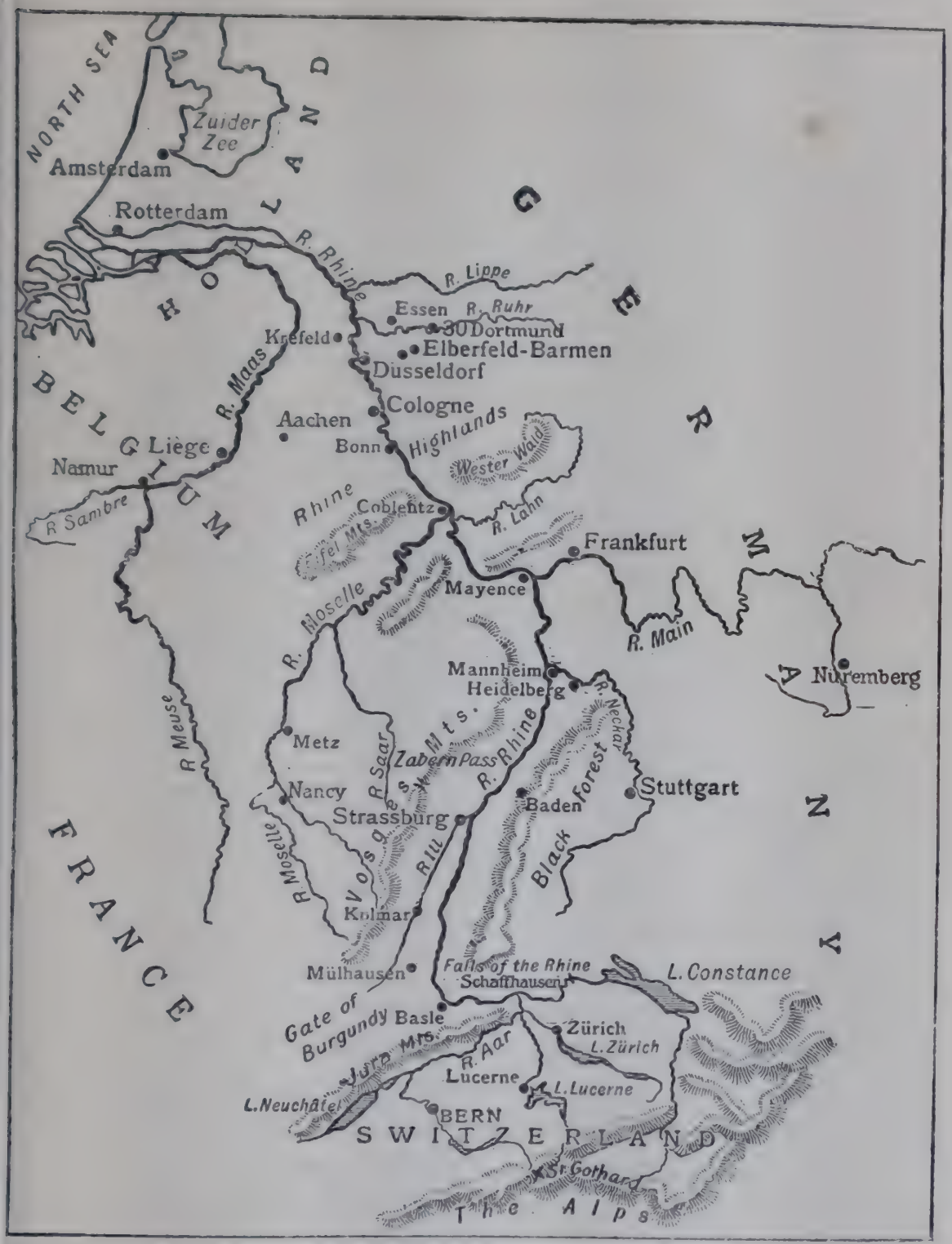
GERMANY AND THE LOW COUNTRIES: RELIEF.

from monotony by the Harz Mountains and a few low hills. South of the German Jura is the plateau of the Upper Danube, while to the north-west lies a mountainous country trenched by the Rhine and its tributaries.

GERMAN RHINELAND.

1. **The Rhine Plain.**—The Rhine at Basle bends abruptly to the north, and enters a plain in South Germany. This plain extends to Mayence, and is about 180 miles long and 20 miles broad. It is covered with a rich alluvial soil, which, combined with the hot summer climate, renders the area extremely productive, and wheat, hops, tobacco, and fruit-trees are grown. The plain is flanked by the Vosges on the west and the Black Forest on the east. These mountains have rounded summits, and for the most part are covered with pine-forests. A great deal of timber is cut in the Black Forest, and formed into rafts, which are floated down the Rhine, to be used in other districts or exported at the mouth. The peasants in the Black Forest are skilful in wood-carving, and their cuckoo-clocks are famous.

Towns.—Many important towns lie in the Rhine Plain. **Mülhausen** and other places at the base of the Vosges in Alsace utilize the water-power there available for manufacturing cotton goods. **Strassburg** has a position of great strategic and commercial importance on the Ill



RHINELAND: POLITICAL.

tributary of the Rhine, opposite the Zabern Pass over the Vosges. It is highly fortified, and has a beautiful cathedral. **Mannheim** is a busy port at the mouth of the Neckar, for very large barges can ascend to this point. **Mayence,** or Mainz, as it is often spelt, stands at the confluence of the Main, and, like Strassburg, is fortified. Not far from it and on the Main is **Frankfurt,** which is a great centre for banking.

2. **The South-Western Plateau.**—This is crossed by the Neckar and Main tributaries of the Rhine and the Upper Danube. The soil in some parts is rather infertile, but hops, wheat, barley, and other crops are grown, and a good deal of the region is forested. The hops and barley have given rise to the manufacture of beer at **Munich,** which stands on the Isar, a tributary of the Danube. It is the capital of Bavaria, and a great railway centre. It is also noted for its galleries for pictures and sculpture. The Danube is linked to the Main by a canal, but the traffic on it is small. **Nuremberg** is a picturesque old city on this canal, which is now a great market for hops, and manufactures toys and pencils. These industries are encouraged by the local supplies of wood, and by the presence of graphite mines near the spot where the Danube leaves Germany. The third largest town on this plateau is **Stuttgart,** on the Neckar. This town is the capital of Würtemberg, and manufactures hosiery and chemicals.

3. **The Gorge of the Rhine.**—Between Mayence and Bonn the Rhine flows through a deep gorge which it has cut across the Rhine Highlands. This gorge is so narrow that it is only with difficulty a railway has been made on each side of the river. The steep banks of the river are cut in terraces for vineyards, and the region is rich in picturesque beauty, and in romances connected with the numerous ruined castles that crown the river-cliffs. **Coblenz,** situated, as its name implies, at the *confluence* of the Moselle and Rhine, and also near that of the Lahn, has been strongly fortified. The gorges of the Rhine, Moselle, and Lahn hew the plateau which they cross into four apparent ranges, of which the Eifel on the west has been the scene of volcanic activity in past ages. The Moselle route is guarded by the Germans by the fortified town of **Metz,** in Lorraine. Both coal and iron are found near here.

4. **The lower course** of the Rhine is across the plains of North Germany and Holland. **Cologne** stands on the Rhine, somewhat below the beginning of the plain, and where the river can be conveniently crossed by the route from Paris which skirts the base of the Ardennes and Rhine Highlands. Sea-going vessels can reach this point, save in winter, when the river is frozen, so the town is a busy port. It also manufactures many articles, including eau-de-Cologne. The city has a very beautiful cathedral. Below Cologne the Ruhr enters the Rhine from the east. This passes through a rich coal-field, and as iron is found in the Highlands somewhat farther south, its basin has become a great

GERMANY: POLITICAL.

manufacturing area. Great guns are made at **Essen,** north of the Ruhr, and all sorts of hardware at Düsseldorf, which is the Rhine port for this region. South of the Ruhr lies Elberfeld-Barmen, once two towns, now joined together, where silk, cotton, and woollen goods are manufactured. **Krefeld,** east of the Rhine, is especially noted for silks, on account of the fitness of its waters for dyeing, and **Aachen** for woollen goods. Zinc is mined near Aachen.

NORTHERN AND EASTERN GERMANY.

Climate and Vegetation.—Though the summers are warm, the winters are very cold, especially in the east, where the moderating influence of the westerly winds is less felt than in the west. All the ports

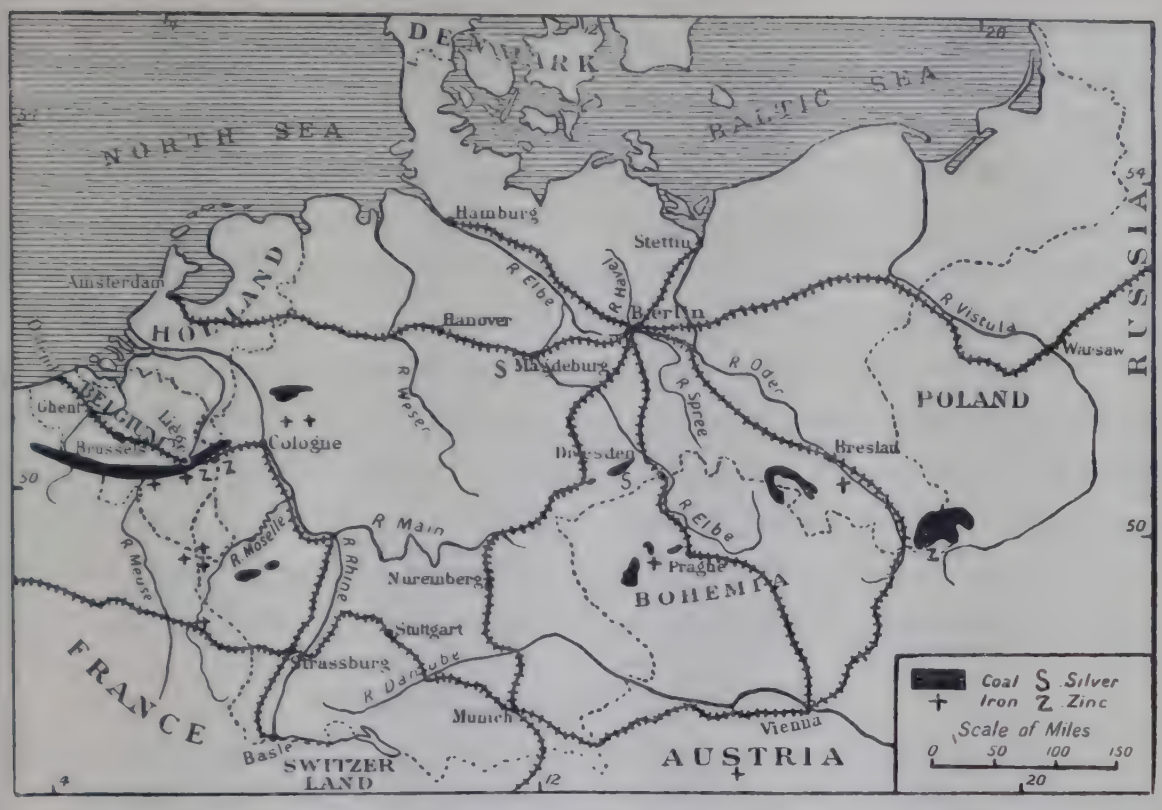
on the Baltic are frozen in winter. The rainfall diminishes towards the east, but is everywhere sufficient for agriculture. The soil of the plains is not very fertile, though the sugar-beet is extensively cultivated in Central Germany, and potatoes, rye, and oats throughout the north. While some of the potatoes are used for food, spirits are distilled from the rest, and the rye is made into bread. Flax also is grown in the north and in Silesia, and hemp in the east. The coast is low and sandy, and wide stretches near it are covered with heath and pine-trees.

The Basin of the Elbe.—The Elbe rises in the Riesen Gebirge in Bohemia, and soon becomes a navigable river. Large barges can, in fact, ascend to Prague on its tributary, the Moldau. The Elbe passes through the wooded Erz Gebirge by picturesque gorges, the district being known as 'Saxon Switzerland,' for the river at this point enters the German kingdom of Saxony. Some silver is mined in the Erz Gebirge, and at their base are coal-fields, which have made Saxony a manufacturing area. **Chemnitz** is a great seat of the cotton industry. **Leipzig,** at the natural point of convergence of routes crossing the plateau of Saxony, has long been a trading centre, and is noted for the manufacture of books and pianos. **Dresden,** on the Elbe, also manufactures pianos, and is noted for its picture-galleries. The china named after Dresden is manufactured at Meissen, a little lower down the river.

The middle course of the Elbe lies through a region where much beet is grown, and sugar is refined at **Magdeburg** (see p. 328). This town stands at a bend of the river, and where it is crossed by a bridge. A little to the south of it is Stassfurt, where potash salts used in chemical industries are mined, and to the west lie the picturesque Harz Mountains, where silver and copper are mined. Some way farther on the Elbe receives the Havel, which has a tributary called the Spree.

Berlin, the capital of Germany, stands on the Spree at a convenient crossing-place; and as this river is connected by canal with the Oder, it is the centre of waterways leading to the North Sea, the Baltic Sea, and to the well-populated areas which occupy the basins of the Upper Elbe and Upper Oder. On account of its central position it is also a great railway centre. Several minor industries are carried on, and the town has a large university. Berlin suffers, however, from the absence of coal in the vicinity and relative infertility of its surroundings.

Hamburg.—The Elbe enters the North Sea by a long estuary, at the head of which is the great port of Hamburg, and the smaller one



GERMANY AND THE LOW COUNTRIES: RAILWAYS AND MINERAL DEPOSITS.

Altona. Excluding some capitals, Hamburg is one of the largest towns on the Continent, and its trade is enormous. It has a deep harbour, free from ice in winter, and a deeper outport in Cuxhaven. It occupies an unrivalled position for the export of goods from the basins of the Elbe and Upper Oder, and for direct trade with foreign lands is better situated than the Baltic ports, though vessels from the Baltic can now reach the North Sea by the **Kaiser Wilhelm Ship Canal** without going round Denmark. This canal is guarded by the naval station of **Kiel.**

Bremen.—Some of the American liners start from Bremen, on the Weser, instead of from Hamburg, as the former port is still farther west; but though it has a great trade, it is not so well placed as Hamburg for collecting and distributing goods. It has a deeper outport in Bremerhaven. **Emden** has become the direct outlet for the Ruhr basin since the construction of the Dortmund-Ems Canal.

The Basin of the Oder.—The Oder rises in Austria, but soon enters Germany, and is navigable from the frontier to the Baltic, save in winter. Its upper course is through the province of Silesia, where coal and iron are found. These minerals have led to the opening of an iron industry at **Breslau,** which stands at a convenient crossing-place on the Oder. Breslau and some other towns in Silesia also manu-

facture woollen goods, an industry assisted by the local supply of wool from the sheep reared in the district. The port of the Oder is **Stettin,** which stands at the head of the estuary. It has the drawback of being frozen in winter, like all the Baltic ports, and, moreover, in order to reach it, vessels must cross the Haff—a shallow stretch of water, which is nearly shut off from the sea by low, sandy islands. It has, however, a fairly deep outport on one of these islands.

The chief other Baltic ports are Lübeck, Danzig, and Königsberg. **Lübeck** was very important in the Middle Ages, and has benefited by the construction of a canal to the Elbe in recent times. **Danzig,** at the mouth of the Vistula, exports much timber, which is floated down the Vistula, as well as the cereals, flax, hemp, and potatoes of the surrounding district. Königsberg has a similar trade.

BOUNDARIES AND COMMERCE.

The central position of Germany in North Europe enables it to trade direct by land with Denmark, Russia, Austria, Switzerland, France, Belgium, and Holland, for it touches all these countries. The frontier coincides with no physical features of importance, save in the south—a fact that facilitates trade, but increases the difficulty of defence. The foreign trade of Germany is greater than that of any other country in the world, save our own, and its internal trade is also enormous, on account of the facilities for transport afforded by its good railway system, and many navigable rivers and canals. Internal trade has benefited, too, by the formation of a Customs Union, to which all the States which form Germany, and the Grand Duchy of Luxemburg, belong, and by which duties on goods are restricted to foreign trade, and levied at the same rate.

The chief exports are textiles, agricultural and animal products, metals and minerals, machinery, chemicals, and many other manufactured goods. The only important export from the independent Duchy of Luxemburg is iron, in which mineral it is remarkably rich.

HOLLAND.

Boundaries and Relief.—The lowlands of Holland are separated by merely artificial frontiers from Germany on the east and Belgium on the south. Much of the land is so low that it is estimated that 40 per cent. of the country would be under water were it not for the sand-dunes and dykes along the shore. The Zuider and Dollart Zees were, in

HOLLAND AND BELGIUM: POLITICAL.

fact, created by inundations in the thirteenth century. The basins of the Lower Rhine and Maas, or Meuse, form the most important part of the country.

Dutch Rhineland.—Throughout its course in Holland the Rhine is flowing over low land, which it created during past ages from the

sediment it brought down and spread out in time of flood. These floods were, in fact, partly due to the sediment itself, for this gradually raised the bed of the Rhine, till the river constantly overflowed its banks. Now the river has been embanked, as well as many of the low fields, called 'polders,' in the country, which have been reclaimed from the sea by artificial drainage. Many canals have been cut, and into these superfluous water can be pumped by means of windmills. These canals are also useful for navigation, and when frozen in winter make capital roads to skate on. They are often bordered with willows, but otherwise Holland lacks trees.

Productions.—Most of Holland is pasture-land devoted to cattle, and the country is noted for its butter and cheese. Some flax is grown and manufactured into linen at Utrecht and other towns. Rye is also cultivated and distilled into gin, while other common crops are oats and potatoes. Round Haarlem the soil is suited for bulbs. Horses are reared in the north. Save for some clay, which has favoured a pottery industry at Delft, the country is lacking in mineral wealth.

Chief Towns.—The delta of the Rhine is cut up into many low islands by the channels, or tributaries, into which the river divides near its mouth. Most of these channels are shallow, and **Rotterdam**, the port of the Rhine, has had to be connected with the North Sea by a canal. Just north of Rotterdam is **The Hague**, which is the seat of the Dutch Government, and still farther north is **Amsterdam**, the largest Dutch city. Amsterdam stands on the shores of the shallow Zuider Zee, but has been connected by canal with the North Sea. It is noted for diamond-cutting, and is also a great coffee market, on account of the important Dutch possessions in the East Indies. The **Hook of Holland** and **Flushing** are important packet stations.

Trade.—The position of Holland at the mouth of such an important waterway as the Rhine causes it to have a very large transit trade. Most of the goods exported from Holland are, in fact, those that have reached it from Germany. Of home productions its chief export is dairy produce.

BELGIUM.

Boundaries and Relief.—Belgium is bounded by Holland, Germany, and France, but the frontiers are only artificial. The intermediate position of the country is illustrated by the battle-fields, strewn

over the diagonal plain between the Ardennes to the south-east and the coastal marshes, that formed a natural highway for forces advancing from either France or Germany. The Ardennes are a western extension of the Rhine Highlands, but are not very high, and are mainly devoted to rearing sheep. Coal and iron occur along the northern margin, as well as zinc towards the west.

Industries.—The coal and iron have made Belgium an important manufacturing country, though it also rears cattle; and cereals, sugar-beet, and flax are grown on the fertile lowlands. Iron is manufactured at **Liège,** which specializes in firearms, and at **Namur.** Both these towns benefit by their position on the Meuse near the confluence of tributaries, and are centres for the manufacture of glass and chemicals. Linen goods are chiefly manufactured at towns on the Upper Scheldt and its tributary the Lys, as the waters are good for bleaching, and flax grows near at hand. Cotton goods are made at **Ghent,** which has a splendid situation at the confluence of the Lys and Scheldt, and is connected by a ship-canal with the estuary of the Scheldt. Lace is a speciality of **Brussels,** the capital of the country, which has the advantage of a central position.

Trade.—The chief port of Belgium is **Antwerp,** at the head of the estuary of the Scheldt. It has a deep harbour, and is well situated for the distribution of goods by rail as well as by waterways, leading to the Oise tributary of the Seine, the Meuse, and the Rhine. The old town of **Bruges** has also been made a port by the construction of a ship-canal to the coast. **Ostend** is a packet station on the low sandy coast, which can be reached in about four hours from Dover. Belgium, like Holland, has a considerable transit trade, but its special trade is also great for the size of the country, on account of its fertility, industrial character, and high density of population. **The chief exports** of home production are machinery, iron, and coal.

DENMARK.

This country consists of the low peninsula of Jutland and various islands, the largest being Zealand. The scenery resembles that of Holland, with its pastures, marshes, and sand-dunes, but it also possesses some fine forests of beech-trees. Cattle and poultry are reared, and butter and eggs exported in large quantities. **Copenhagen,** the capital, stands on Zealand, guarding the Sound. Most vessels from the

SCANDINAVIA: RELIEF AND RAILWAYS.

North Sea, after passing through the Skager Rak and Kattegat, which separate Jutland from Norway and Sweden respectively, enter the Baltic by the Sound in preference to the Great or Little Belt. Copenhagen has therefore become a great centre of trade, and it has a magnificent harbour. Gloves are manufactured there.

Iceland.—To Denmark belong Iceland and the Faroe Isles. Iceland possesses an active volcano, Mount Hekla, and many hot springs and geysers. Sheep and ponies are reared, but the cold damp climate renders agriculture difficult, and the inhabitants chiefly subsist by fishing and by collecting birds' eggs and the feathers of the eider-duck.

The Highlands which traverse the peninsula are called the Kiolen Mountains in the north, and the Dovre Field and Hardanger Field in the south. These Highlands are remnants of a plateau, and are highest in the west, so that there is an abrupt slope to the North Sea, and more gradual slopes to the Baltic and lowlands of Southern Sweden. The rivers, which have deeply trenched the Highlands, form magnificent waterfalls in their descent, especially those flowing westwards. The eastern rivers are also rapid, but longer, and many pass through long narrow lakes of clear, though not blue, water. None of the rivers are of much use for navigation, but they afford water-power.

Climate. — The altitude and northerly position of Scandinavia cause the climate to be very cold, and in winter the Highlands are buried in snow. In some parts the snow remains all the year, and in the high upper valleys gives rise to mighty glaciers like those of Switzerland. The western side of the Highlands is warmer in winter than the eastern side, for the temperature is moderated by the influence of the south-westerly sea winds. These winds, however, cause the rainfall on the west to be very heavy at all seasons. On account of its northern latitude, Scandinavia enjoys peculiarly long days in summer, which partly compensate for the shortness of the season and the correspondingly long nights of winter. Many tourists go to the North of Norway in summer for the sake of seeing the sun shining at midnight (see p. 4).

The Lumber Industry.—The summits of the Highlands, apart from the snow-fields, are either barren or covered with coarse grass and heather. In some of the valleys and on the slopes, especially in Sweden, there are forests of fir, pine, and silver birch, which are valuable sources of timber. The trees are generally cut in winter, when logs can be most readily hauled over the frozen snow to the banks of the rivers, down which they are floated during the spring floods. The rapids on the rivers afford water-power, which is used in sawing up the timber, or converting it into wood-pulp for paper. The pine-trees yield tar and turpentine as well as timber. Since Scandinavia is deficient in coal, wood is the chief fuel, and in the country it is used for building houses.

Lapland.—In the far north of Scandinavia and Russia the cold climate has reduced vegetation to mosses, lichens, Alpine plants, and stunted berry-bearing bushes, while throughout the long winter the

region is buried in snow. Life would be impossible in such a desolate area were it not that the **reindeer** can live on a kind of moss, and can find and uncover this even when it is buried under the snow.

The reindeer can be taught to draw sledges, and, moreover, yields milk, meat, skins, horns, and bones. Large herds, therefore, are reared by the Lapps, who are obliged to lead a wandering life throughout much of the year, for they follow the herds, which, as they eat up the moss in one place, pass on to fresh districts. When constantly on the move, they find a tent is the best kind of dwelling-place, as it can be easily shifted; but in winter they generally settle down somewhere, and dwell in huts. Fish can be caught when the rivers and sea are not frozen, berries are picked and eaten in the summer, and some animals hunted in the forests of the south; but no crops can be grown, and the life is a very hard one.

NORWAY.

Norway is separated from Sweden by the sparsely populated Scandinavian Highlands, and the seaboard forms the only portion of the country of much economic importance. The coast is much indented by long, narrow, winding fiords. These were formed by the submergence of the lower valleys of rivers very long ago which had previously been glaciated. Around these lakelike inlets the grey granite cliffs in many places rise nearly precipitously, but at the heads of the fiords there are generally small tracts of low land where hardy crops can be cultivated and the small scattered population of the country dwell.

The Fishing Industry and Towns.—Many of the Norwegians are small farmers, or are engaged in the lumber industry, but a large number are sailors or fishermen. Some go to the whale and seal fisheries of the Arctic Ocean, and many catch cod and herring along their own coast and around the Dogger Bank. The fish are particularly plentiful in the waters sheltered by the high, rocky Lofoten Isles. They are caught during the dark winter months, and split and dried on the shores before being exported. Cod-liver oil is also manufactured. The fishing industry benefits by the supply of timber for manufacturing barrels, and of ice for packing with the fish to keep them fresh. **Bergen** is the chief centre of the fish trade, but much is also exported from **Trondhjem**, on Trondhjem Fiord, and **Christiania**, at the head of Christiania Fiord, though the harbour of the last mentioned is frozen in winter.

SCANDINAVIA : POLITICAL.

Christiania is the capital of Norway. It is connected with Trondhjem by a railway which follows the valley of the Glommen. **The chief exports** from Norway are fish, timber, wood-pulp, and paper.

SWEDEN.

The lowland area in the south is the most important part of the country, though even here the population is sparse. The rocky floor of the country is very uneven, and swamps and lakes occupy the depression.

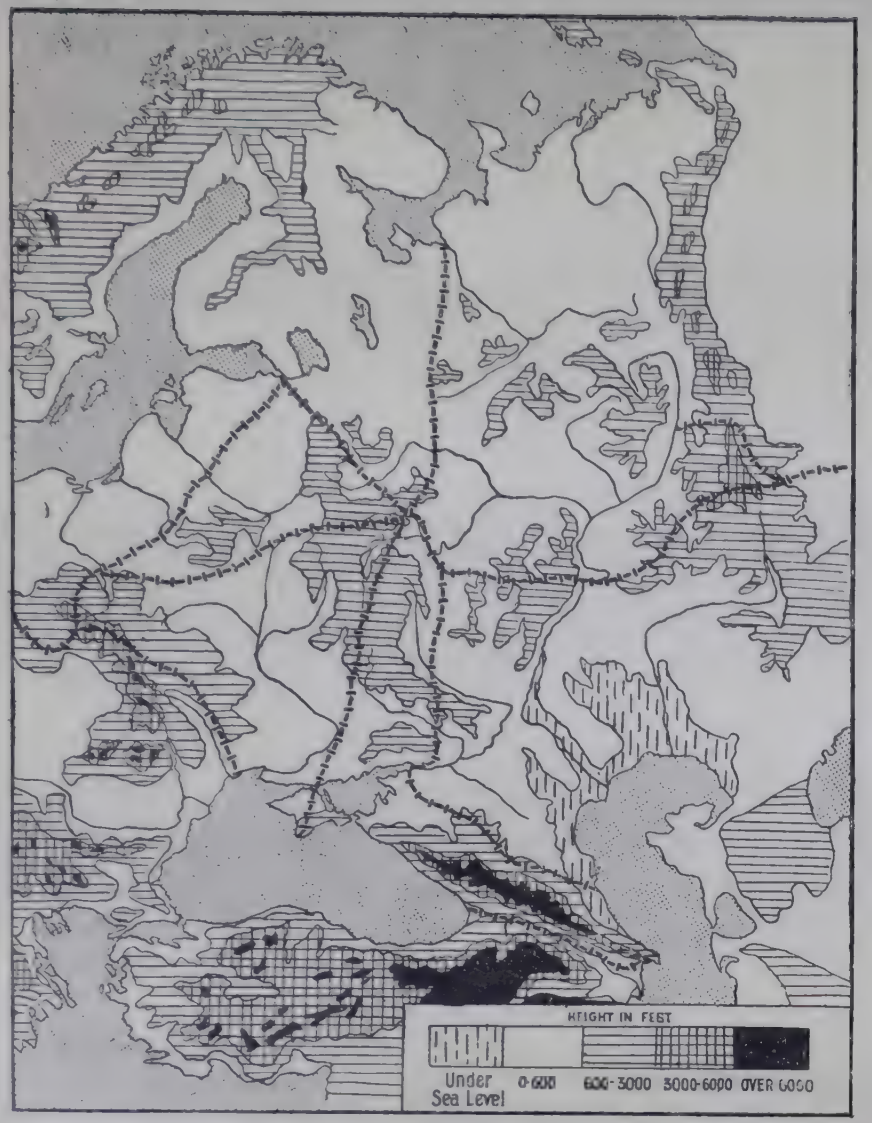
Two of its largest lakes—Lake Wener and Lake Wetter—are connected by canal with each other, and with the Kattegat and Baltic. This canal starts at **Göteborg,** or Gothenburg, as it is sometimes spelt, and is called the **Göta Canal.**

Industries and Towns.—Much of Sweden is forested, and many find employment in the timber trade, or in manufacturing matches and paper. In places, however, there are good pastures for cattle, and excellent butter is manufactured. Such hardy crops as rye, oats, and potatoes are also cultivated. There are good deposits of iron at **Dannemora** and **Gellivara**. The ore from the latter can be exported by rail either to the Gulf of Bothnia, which is frozen in winter, or to the Atlantic, which is never frozen. **Stockholm,** the capital of Sweden, has a beautiful situation on an island at the entrance to Lake Mälar, and extends over both shores of the mainland, with which it is connected with bridges. To the north lies **Upsala,** which possesses a cathedral and University. **Malmö** is a packet station in the south for Copenhagen, with which it is connected by train and ferry steamers. Wisby on the island of Gothland, which belongs to Sweden, was a great centre of trade in the Middle Ages. **The chief exports** from Sweden are timber—by far the most important—iron, butter, wood-pulp, paper, and matches.

EASTERN EUROPE.

EUROPEAN RUSSIA.

Extent and Relief.—Russia consists of a great plain extending to the Arctic Ocean and the White, Baltic, Black, and Caspian Seas. On the east the frontier between Russia and Asia is partly defined by the Ural Mountains and Ural River, though it extends east of the southern portion of the mountains and west of the southern portion of the river. South of the Urals communication with Asia is easy, and it is not surprising, therefore, that the Russians have been able to conquer so much of the country. On the south Russia extends south of the Caucasus Mountains. These mountains are higher than the Alps, and are as yet uncrossed by any railway, though railways skirt round the two ends, and a good road goes over the Dariel Pass about their middle point. The low Valdai Hills in West Central Russia, and various ridges running from these south-westwards and north-eastwards, form the sources of rivers which radiate to the four seas.



RUSSIA : RELIEF AND RAILWAYS.

RUSSIA : VEGETATION.

Climate and Vegetation Regions.—The whole of Russia suffers from great cold in winter on account of the remoteness of the country from the influence of ocean winds, and the absence of protection from winds from the north. Snow prevails everywhere at that season, and sledges take the place of carriages. All the rivers and ports are also frozen. In summer, on the other hand, the heat is often great in the central and southern portions, and for the same reason—*i.e.*, the slight influence of ocean winds. The absence of these winds also renders the rainfall slight and wholly inadequate in the south-east. What falls comes chiefly in summer, when hot air rises over the land and winds from the seas around, which have evaporated moisture, tend to blow inwards. The great differences in temperature and rainfall over so large an area have caused great differences in vegetation, so that the country can be divided into the vegetation regions shown on p. 97. The scenery of Lapland has been already described (see p. 93), and that of the low northern marshes called the Tundras is similar.

NORTHERN RUSSIA.

The Forest Belt.—This is a continuation of the forest belt of Scandinavia, and extends over the whole of North Russia, south of the Tundras, and most of the Ural Mountains. Large areas in the western portion have, however, been cleared for crops. The prevailing trees are pine, fir, and silver birch in the north, and birches, oaks, and beeches in the south. The bark of the birch-tree is used in tanning, and gives Russia leather its peculiar smell. These forests afford shelter for foxes, bears, squirrels, and other animals, which are hunted on account of their skins. Large quantities of timber and furs are exported from **Archangel,** at the mouth of the Northern Dvina, during the five months when the waters are not frozen.

Finland.—Between the White Sea and the Baltic lie the lakes of Onega and Ladoga, which are connected by a river, and are joined to the Gulf of Finland by the Neva. A change of rock structure occurs along this series of waterways, the rocks which prevail west of it over Finland being granite and crystalline rocks like those found in the lower parts of Scandinavia. The scenery, in fact, closely resembles that of Southern Sweden, with its forests and lakes, though the country politically belongs to Russia. The Finns, too, in many respects resemble the

RUSSIA: POLITICAL.

Swedes, and are highly civilized, though they speak a language akin to that used by the Lapps. The capital of Finland is Helsingfors.

The Baltic Plain.—Though much of this area is still forested, such crops as rye, oats, flax, hemp, and potatoes are grown in many parts. From the rye a kind of black bread is made, which is the common food of the peasants, and spirits are distilled from the potatoes. These crops and timber are exported from **Riga,** at the mouth of the Western Dvina, and from **St. Petersburg,** at the mouth of the Neva, during the seven or eight months when these ports are not frozen. St. Petersburg, the capital of Russia, is a finely built city, with many scientific and

educational institutions. As a port it has been improved by the construction of a ship-canal from the fort of Kronstadt.

Poland.—This area is watered by the Upper Vistula, which is useful for exporting timber and crops to the Baltic. It is a manufacturing district, for coal and iron are mined in the south. Textiles are made at **Lodz,** and machinery and leather goods at **Warsaw,** the capital of Poland. Warsaw stands at the head of steam navigation on the Vistula, and is on the railway which crosses the North German Plain, and here branches. One line goes to St. Petersburg, via Vilna, and the other to Moscow.

CENTRAL AND SOUTHERN RUSSIA.

The Basin of the Upper Volga.—The Volga rises in the Valdai Hills, and is navigable from near its source to its mouth, but is shallow, liable to be obstructed by sand-banks, frozen in winter, and empties into an inland sea, the Caspian. At the junction of the Oka stands **Nijni-Novgorod,** long famous for its great annual fairs, and on a navigable tributary of the Oka is **Moscow.** Moscow has such a central position in Russia that it is naturally the chief railway centre, and was formerly the capital. Next to St. Petersburg, it is the largest city in Russia, and possesses a University. Metal and leather goods are manufactured, as well as cotton and other textiles. These industries benefit by a small coal and iron field to the south round **Tula,** where iron and leather goods are also made. The Volga, after passing the old trade centre of Kazan, receives the Kama, down which is brought the coal and iron of the district round **Perm.**

The Basin of the Lower Volga.—Soon after Perm the Volga enters **The Steppes,** or grass-lands, which formerly extended over Southern Russia and Siberia. Large areas are, however, now cultivated, especially in the west and north, where the rainfall is better and the soil more fertile. Tobacco, for instance, is cultivated round **Samara,** situated at the bend of the Volga, where the railway from Moscow branches for Siberia and Russian Turkistan. It is also grown round **Saratov,** but south of this the region is only devoted to rearing horses and cattle, and near the Caspian becomes a saline desert dotted with marshes. The Volga, near its mouth, is frequented by sturgeon, as well as the Caspian Sea, and **Astrakhan** is therefore a busy fishing centre, though it is frozen for three months in winter.

The South-Western region is crossed by the Don, Dnieper, and Dniester, which flow to the Black Sea. Rapids unfortunately impede navigation on the Dniester, and on the Dnieper at its bend. Coal is found in the valley of the Donetz tributary of the Don, and iron at Krivoi Rog, north of Kherson. Much of this region is covered by an exceedingly fertile soil known as the 'Black Earth,' and large crops of cereals, sugar-beet, and tobacco are produced. Sugar is refined at **Kiev,** on the Dnieper, where much trade is carried on at periodical fairs. Fairs are also held at **Kharkov,** on the Donetz, which has tobacco, woollen, and iron manufactures. Quantities of wheat are exported from **Odessa,** which has the deepest harbour on the Black Sea, as well as from **Kherson,** at the mouth of the Dnieper, and Rostov, at the mouth of the Don.

The Southern Regions.—In Southern Crimea and parts of Caucasia the vine flourishes, and olives and other Mediterranean fruits ripen. Even cotton can be grown round **Tiflis,** the town which commands one end of the road over the Caucasus Mountains by the Dariel Pass, and the capital of Caucasia. The chief port of the Crimea was **Sebastopol,** which is now solely a naval station. Round **Baku,** on the Caspian, there are vast supplies of petroleum, which are exported from there, as well as from **Batum,** on the Black Sea (see p. 333).

COMMERCE.

It will have been seen from what has gone before that Russia, on account of its extent, is able to produce a great variety of vegetable productions, and is also rich in minerals. The chief coal and iron fields are shown on the map on p. 97. Gold, copper, and platinum are also mined round Ekaterinburg in the Urals. The country can therefore be to a large extent self-sufficing, which partly accounts for its comparatively small foreign trade. This trade is also limited on account of the freezing of all ports in winter from two to seven months, and by the heavy duties to be paid on imported goods. For internal trade Russia has a splendid system of waterways, but these are frozen in winter. Its railways, too, are not sufficient for an area equal to about half Europe, and many of its roads are poor. The population of Russia is sparse, compared with its size, and the poverty and ignorance of the peasants are other factors curtailing commerce.

The chief exports are cereals (see pp. 326 and 328). Others are timber, flax, eggs, dairy produce, petroleum, and leather.

AUSTRIA-HUNGARY.

Relief and Natural Regions.—The Austrian Empire consists of the following physical areas: (1) The plateaus of Bohemia and Moravia; (2) eastern Alpineland and part of the plateau of the Upper Danube; (3) the Carpathians, including the highlands of Transylvania and the slope to the north which forms the province of Galicia; (4) the plain of Hungary; (5) mountainous regions bordering the Adriatic.

BOHEMIA AND MORAVIA.

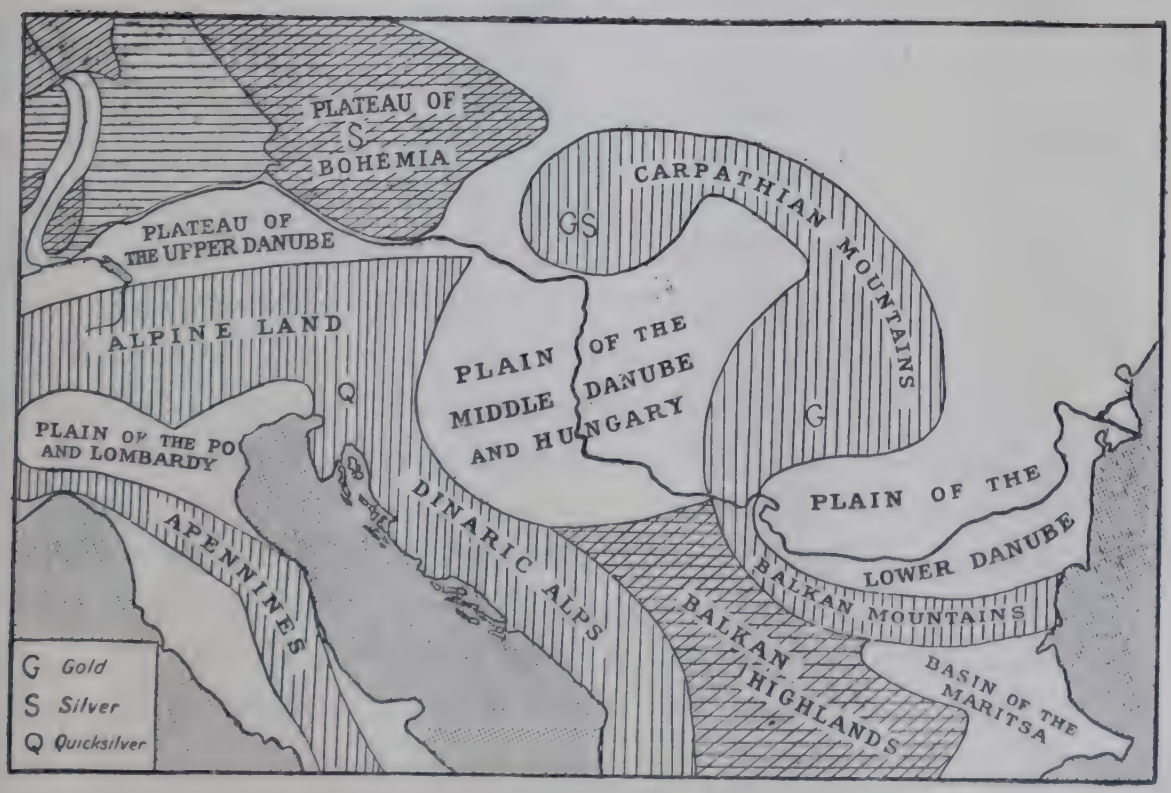
Bohemia is a plateau surrounded by ranges and drained by the Upper Elbe. The northern district is devoted to cereals, orchards, sugar-beet, and hops. The hops have promoted the manufacture of beer at **Pilsen.** Mineral springs occur in the north-west, and have given rise to health resorts at Karlsbad and other places. Porcelain and glass are made in Bohemia, and benefit by local supplies of kaolin and of potash supplied by the numerous forests. **Prague,** the beautiful capital of Bohemia, is centrally situated on both banks of the Moldau, at the head of important navigation. As coal and iron are mined to the west of the town, it has hardware as well as textile and other industries.

The Moravian plateau, which adjoins Bohemia, is partly devoted to sheep-rearing; and as coal occurs near **Brünn,** a woollen industry has arisen there. Both in Bohemia and Moravia the majority of the inhabitants belong to the Slavonic race, and speak a language called Czech.

NORTHERN AUSTRIA.

Austrian Alpineland.—The Danube rises in the Black Forest, and then crosses a plateau which lies partly in Germany and partly in Austria. It becomes navigable for small boats not very far from its source, and rapidly increases in size on account of the many tributaries it receives from Alpineland. The largest of those which flow northward is the Inn, which has a tributary called the Salzach. **Innsbruck** stands on the Inn where the river was bridged long ago to enable traffic from northern towns to pass southward across Alpineland over the Brenner Pass. Innsbruck is the capital of the province of Austria called the Tyrol. The scenery here and throughout Austrian Alpineland resembles that of southern Switzerland, though the mountains are not so high. Vines are

DANUBELAND: RELIEF.



DANUBELAND: NATURAL REGIONS.

AUSTRIA-HUNGARY: POLITICAL.

grown for wine in the valleys, and on the mountain slopes there are pastures for cattle and pine-woods. Other towns in Austrian Alpineland are Salzburg, with its castle-crowned hill on the Salzach, and Graz, on the Mur tributary of the Drave. Salt is mined near Salzburg, and iron near Graz, which has therefore iron manufactures. Quicksilver is found near Idria, much farther south-west.

Vienna, the capital of Austria, stands on the Danube just below the point where the river descends from the plateau of its upper course, and before it passes between Alpineland and the Little Carpathians, to enter the Plain of Hungary. It has a splendid position for trading both by river and railway. The Orient Express Line from Paris to Constantinople passes through it, and another line from it runs south-

westwards over the Semmering Pass and through Graz to the port of Trieste. Other lines run north-westward to Bohemia, and north-eastward up the valley of the March tributary of the Danube through the Moravian Gate to the valley of the Oder. Vienna possesses a large University and splendid picture-galleries and museums. Among its numerous manufactures may be mentioned machinery, silk, furniture, beer, and fancy wares.

Galicia and the Carpathians.—The Carpathians enclose the Plain of Hungary on the north and east; and though not so high as the Alps, are a serious obstacle to traffic. They are well wooded, and gold and silver are mined in the eastern and western extremities. The Theiss and Pruth tributaries of the Danube rise about the middle of the range, but flow in opposite directions. North of the Carpathians lies the Austrian province of Galicia, where the chief crops are rye, oats, flax, and potatoes. The two chief towns in this province are **Cracow** and **Lemberg,** on a route skirting the base of the Carpathians, and commanding routes across them. South of Cracow are the famous salt-mines of Wieliczka.

HUNGARY.

Some way east of Vienna the Danube turns sharply southward across the Plain of Hungary. This plain was once a vast grass-land, but now large areas of it are devoted to growing wheat, maize, and sugar-beet. The vine is cultivated in some districts, and Tokay, at the head of navigation on the Theiss, is noted for its wine. On the still existing grass-lands great herds of cattle and horses are reared, while the cheapness of grain has encouraged the rearing of poultry. In winter the plain lies buried in snow, and in summer vegetation suffers from heat, for the climate is one of extremes. On this plain dwell people of many nationalities, of which the most important are the Magyars, or descendants of the Huns, who came long ago from Asia, and speak Hungarian. Though Hungary is under the same Sovereign as Austria, it has practically an independent Government, which has its seat at **Budapest.** Buda is an old town, and Pest one that grew up at a later date on the opposite bank of the Danube, and was joined to Buda by bridges. On account of the cereals grown in the district, and comparatively dry climate, a great flour-milling industry has grown up here.

DANUBELAND: RAILWAYS.

SOUTHERN AUSTRIA.

The Adriatic Sea is bounded on the east by the Dinaric and other Alpine ranges. The prevailing rock is limestone, and parts are rather barren, though sheep and goats are reared on the mountain pastures, and large forests still exist in Bosnia. In the valleys wine and oil are produced. The rivers are subterranean in places, and elsewhere are generally rapid torrents flowing at the bottom of deep gorges. The ranges make communication difficult with the coast, but one railway has been constructed across them to the Austrian port of Trieste, another to the Hungarian port of Fiume, and a third reaches the coast after passing through Serajevo, capital of **Bosnia**, and Mostar, capital of **Herzegovina**. Bosnia and Herzegovina are now parts of the Austrian Empire.

BOUNDARIES AND COMMERCE.

The Austrian Empire is well situated for trading by land, for it touches Italy, Switzerland, Germany, Russia, Roumania, Servia, and Montenegro. Its sea trade is, however, hampered by the shortness of its coast-line and the difficulties of reaching it. **The chief exports** are timber, sugar, eggs, woollen goods, and glass.

THE NORTH BALKAN STATES.

SERVIA.

This is a mountainous kingdom through which flows the Morava tributary of the Danube. The valley of this river forms a natural route for the Orient Express Line, after this has passed through Belgrade, the capital of Servia, which stands on the Save, near its union with the Danube. A great deal of Servia is covered with forests of oak and beech, where swine are reared in great numbers. There are also many orchards of cherry, apple, pear, and plum trees. Large quantities of plums are dried every year to form prunes.

ROUMANIA.

The Plain of the Lower Danube.—The Danube enters this plain through the Iron Gates, the name given to gorges between the Carpathians and the Balkans, where the river forms rapids, and where a canal has had to be cut to avoid them. The plain, like that of the Middle Danube in Hungary, is covered with grass, or devoted to wheat, maize, and other crops. The Danube forms the frontier for some distance between the kingdoms of Roumania and Bulgaria.

Roumania includes not only the land bounded by the Carpathians, Danube, and Pruth, but also the land between the Black Sea and the Danube, after the river turns northwards. The delta of the Danube is crossed by many channels, and is marshy and unhealthy. Wheat and maize are exported from ports near the mouth of the river, but these are frozen in winter. The capital of Roumania is **Bukarest.**

BULGARIA.

Bulgaria extends southward across the Balkan Mountains, and over the upper basin of the Maritza. In the valley of the Tunja, a tributary of the Maritza, quantities of roses are grown, and a scent called ' attar of roses ' is manufactured. The Upper Maritza Valley is followed by the Orient Express Line, after this has passed through **Sofia**, the capital of Bulgaria. Sofia, besides benefiting by traffic along this line, lies near a road which follows the valley of a tributary of the Danube, and crosses the Balkans. Another road crosses the Balkans by the Shipka Pass, but no railway has yet crossed them. The Balkans are well forested, and vines and fruit-trees are grown on their lower slopes. **The chief export** of Bulgaria is wheat.

SOUTHERN EUROPE.

THE MEDITERRANEAN REGION.

The Mediterranean Sea is about 2,300 miles long. It is entirely enclosed by land, save where the Straits of Gibraltar lead to the Atlantic, where the Dardanelles, Sea of Marmora, and Bosphorus all lead to the Black Sea, and where the Suez Canal connects it with the Red Sea. One long arm of it, the Adriatic Sea, extends between Italy and the Balkan Peninsula; and another part, the Ægean Sea, lies between the Balkan Peninsula and Asia Minor.

Islands.—There are many islands in the Mediterranean, of which the largest are Corsica, which belongs to France; Sardinia and Sicily, which belong to Italy; Crete, or Candia, which enjoys self-government within certain limits; Cyprus, which belongs to Britain; and the Balearic Isles, which belong to Spain. The most important small island is **Malta,** which belongs to Britain. It lies south of Sicily, and thus guards the channel between Sicily and Africa; and the chief town, Valetta, is highly fortified. It forms a convenient coaling station for vessels going to the East.

The Mediterranean is almost tideless, as a result of its land-locked nature. Its waters are warm and pure, but saline, as the warm climate promotes rapid evaporation, and the supply of fresh water received from rivers is relatively small (see p. 125). The warm temperature has encouraged the growth of sponges in the Ægean Sea, and of corals off the west coast of Italy. The sea is also rich in sardines, anchovy, tunny, and other fish. The coasts which surround the Mediterranean are mainly rocky and mountainous, if we except the low, sandy shore along the eastern African seaboard, and the scenery is generally very picturesque.

Climate.—The Mediterranean region is very hot in summer, and fairly warm in winter, both on account of its southerly latitude, and of its being sheltered from cold winds from the north by the belt of ranges and plateaus of Central Europe. It enjoys also a large amount of sunshine, especially in the south and east, where the rainfall is very slight. The rainfall is heaviest on the western slopes of the Apennines and the Alpine ranges bordering the Adriatic, as these are most exposed to moisture-laden westerly winds, and the mountains promote condensa-

tion. The rainfall occurs chiefly in winter, as it is only at that season that the westerly winds blow strongly over it (see Maps on pp. 4 and 5).

The Vegetation of this region is to some extent adapted to withstand the hot, dry summers. Some plants can endure a long drought, because they have long roots like the vine, and so can obtain moisture from a great depth; and some have bulbous roots, like those of lilies and tulips, in which they store moisture. Others, again, have leaves which are thick-skinned, and so avoid the rapid loss of moisture by evaporation. Among these are the laurel, olive, orange, and lemon trees, as well as pine-trees and certain palms. Wheat grows well, because it can be grown through the winter, and thus receive rains in its early stages, and be reaped in early summer. As a rule the trees in this district are scattered in small clumps, and there is little rich pasture-land. The most typical productions of this region are wheat, wine, and olive-oil.

THE IBERIAN PENINSULA: SPAIN AND PORTUGAL.

THE CENTRAL PLATEAU.

Most of the peninsula is occupied by a plateau. On the south there is a steep descent to the Basin of the Guadalquivir, and here the high edge of the plateau is called the Sierra Morena Range. On the north-east there is also a high edge overlooking the Ebro basin, called the Iberian Mountains, while on the north the plateau is bounded by the Cantabrian Mountains. The slope of the plateau is from east to west, as can be seen from the general direction of the rivers Douro, Tagus, and Guadiana. These rivers form rapids near the frontier of Portugal, where they descend from the plateau, and are too rapid or too shallow in many other places to be of much use for navigation. They flow at the bottom of deep valleys, which trench the plateau from east to west, and convert the intermediate regions into parallel ranges known as the Sierra de Guadarama, the Mountains of Toledo, and the Sierra Morena.

Climate and Vegetation.—The plateau is, to some extent, shut off from the influence of sea winds by its high margins, and, as before stated, it is only in winter in these southern regions that the westerly winds blow strongly from the ocean. This causes the extremes of temperature to be very great, and the region to be rather dry. Much of the plateau, therefore, is barren; and it would be expensive to raise water for irrigation from rivers, running as they do at the bottom of deep valleys.

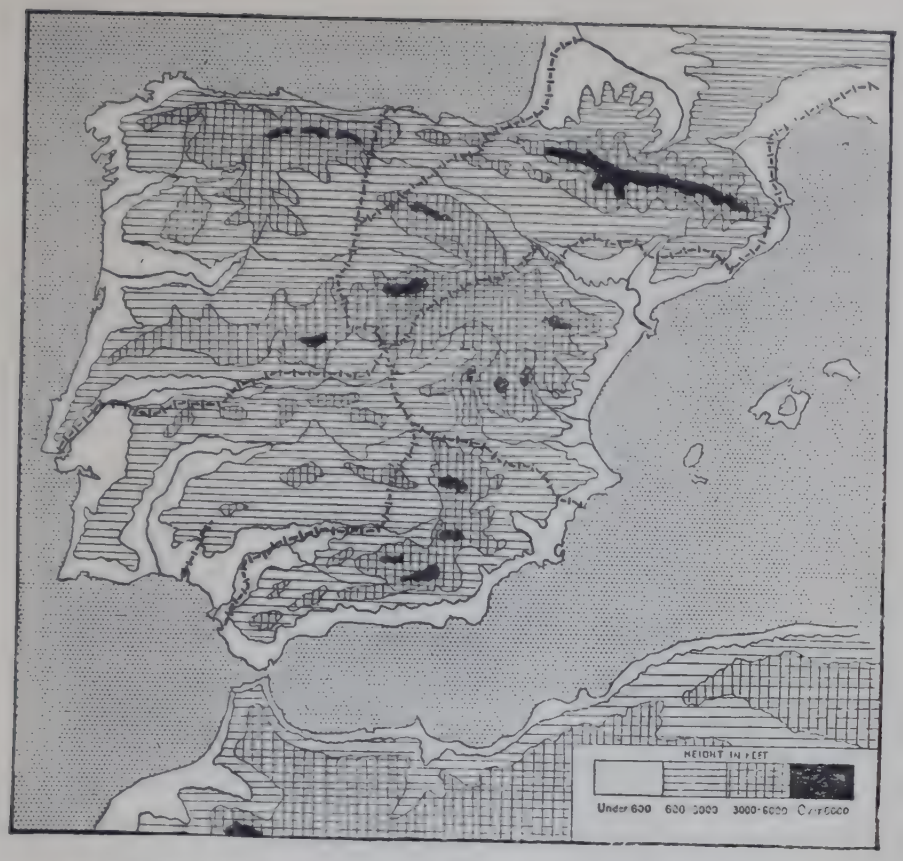
THE IBERIAN PENINSULA: POLITICAL.

Wheat and chick-peas are grown in some parts, but most of the area is treeless, and covered with poor grass. Many sheep are reared on these pastures, as well as bulls, horses, and mules.

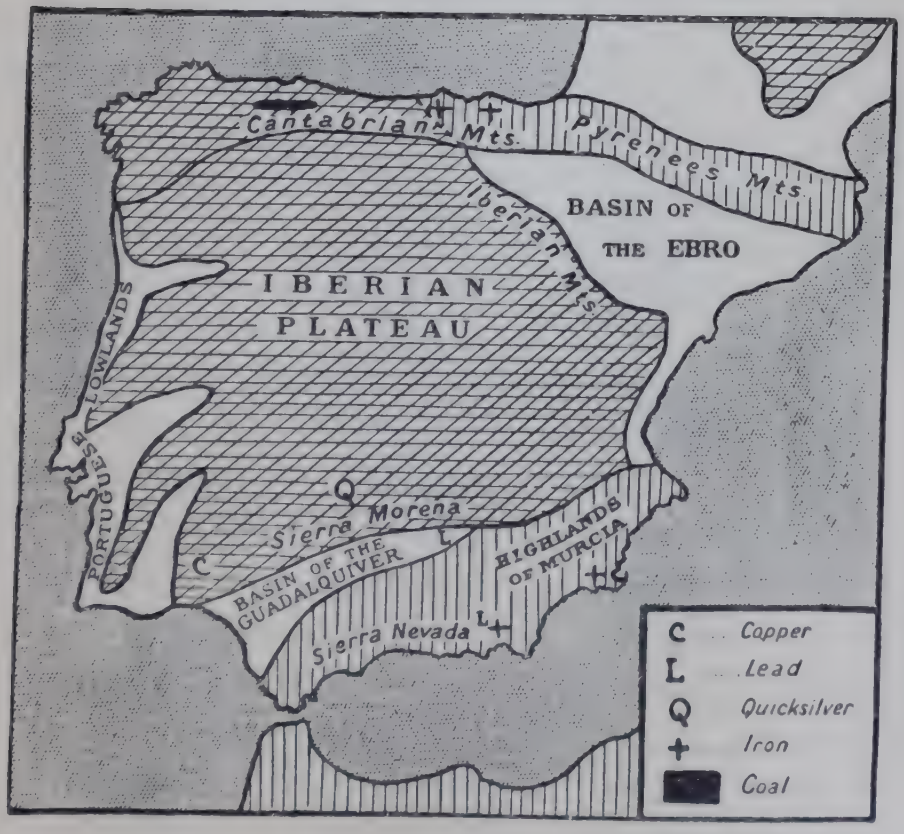
Towns.—The Sierra Morena district is rich in minerals, and quicksilver has long been mined at **Almaden,** to the north, while lead and some silver are found around **Linares.** A great deal of copper is mined near Rio Tinto, and exported from Huelva. The plateau is sparsely populated, though **Madrid,** the capital, stands in the middle of it. On account of its position, it has become the railway centre of the country; but its surroundings are very barren. **Toledo** is still noted for sword-blades.

SPANISH MARGINAL REGIONS.

Southern and Eastern Regions.—It was here that the Saracens



THE IBERIAN PENINSULA: RELIEF AND RAILWAYS.



THE IBERIAN PENINSULA: NATURAL REGIONS.

or Moors, who invaded Spain in the eighth century, remained so long; some, in fact, till about 1600; and here, consequently, are found many buildings of Moorish origin and many Moorish names. The capital of the Moorish kingdom in Spain was at **Granada,** where the famous palace called the Alhambra was built on the top of a wooded hill.

The Basin of the Guadalquivir is extremely fertile, and quantities of oranges, as well as wine and olive-oil, are exported from **Seville,** to which large vessels can ascend, and from the deeper port of Cadiz. The Basin is bounded on the south by the Sierra Nevada, one end of which forms the southern promontory of Spain. This is only separated by the Straits of Gibraltar, which are ten miles wide, from a branch of the Atlas Range, which forms a promontory on the African coast. The town of **Gibraltar** has a fine harbour, sheltered by a peninsula which ends in a great rock. This rock is highly fortified to guard the straits. Gibraltar belongs to Britain, and is used as a coaling station.

Along the south coast of Spain grapes are grown, and are dried to form raisins, which are exported from **Malaga.** In the south-east of Spain are many carefully irrigated gardens, called 'huertas,' in which the vine, olives, oranges, lemons, figs, cereals, onions, and peas are cultivated. A kind of grass, called alfa or 'esparto,' is also grown, and can be manufactured into paper. The temperature is even hot enough for dates at Elche; but the drawback to agriculture is the lack, not of water only, but also of soil. **Valencia** exports large quantities of raisins and oranges. A good deal of iron is mined near **Murcia** and **Cartagena,** and lead near **Almeria.**

The Ebro is of little use for navigation; but its waters feed a canal, which lies parallel with the middle part of the river's course, and is used by small vessels. There is no port at the mouth of the Ebro, as it brings down a great deal of sediment; but farther north is **Barcelona,** the chief port in Spain. It has a large trade in fruit and nuts, and is also an important manufacturing town, especially noted for cotton goods.

The Northern Region.—This area is occupied by the Pyrenees and Cantabrian Mountains. The Pyrenees resemble the Alps, with their snow-crowned peaks, and form a good barrier between France and Spain. The slopes of the mountains are largely clad with forests of oaks, beeches, and chestnuts, for the climate here is temperate, equable, and moist. Zinc and coal are found in the west of the Cantabrians, and a great deal of iron is mined in the east and exported from **Bilbao.**

PORTUGAL.

This country, like the north, enjoys a more equable and moister climate than the rest of the peninsula. Parts are well wooded, and pigs are reared in the forests. Cork is obtained from the bark of cork oaks. The vine flourishes well in the valley of the Douro, and wine is a noted export of **Oporto.** Excellent salt is obtained from Setubal, south of Lisbon. **Lisbon,** the capital of Portugal, has a good position at the mouth of the Tagus, and possesses a fine harbour.

ITALY.

Relief and Natural Regions.—The course of the Alpine ranges in the north and the Apennines throughout the length of Italy divide the country into (1) the northern plain ; (2) a western region between the mountains and the sea ; and (3) a south-eastern region.

THE PLAIN OF LOMBARDY.

This is encircled by the Alps on the north and west, and by the Apennines on the south. On the east it is open to the Adriatic, towards which it slopes, as may be seen by observing the course of the Po. It is a flat-floored area, which has been covered in the course of ages with soft, fertile soil brought down by the Po and its tributaries. The **climate** of the plain is warm, for the Alps protect it from cold northerly winds, but the encircling mountains make it also rather dry. It is therefore fortunate that the plain is crossed by the Po and its many tributaries, which are kept supplied with water by the Alpine snows, for these rivers are of great value in irrigation.

Productions.—Rice is grown on some of the low fields by the rivers, for these can easily be flooded, and rice grows best under water in its early stages. Other important productions of the plain are maize, which is very generally eaten by the Italians ; the vine ; hemp, grown for its fibre ; and mulberry-trees, on which silkworms are reared. The region is also noted for its cheese, on account of its rich irrigated pastures, as well as for its poultry and eggs. The Po is navigable for small boats to **Turin.** This town has an excellent position on the railway running to France through the Mont Cenis Tunnel, and on the railway which leads

ITALY: POLITICAL.

southward through the Apennines to Genoa. Much silk and velvet are manufactured at Turin.

Alpine Tributaries.—The Po receives many tributaries from the north, some of which pass through lakes on the margin of Alpineland. The **Italian Lakes**—Maggiore, Como, and Garda—are noted for their beauty, due to their exquisite colour and the grandeur of the mountains around them. Many of the Alpine tributaries are useful because they descend by falls, which afford water-power. This power can now be turned into electricity, and conveyed to factories which are growing up on the plain at the base of the Alps, and where silk, cotton, and woollen goods are made. As Italy lacks coal, this water-power is very valuable.

The upper courses of these rivers flow through valleys, many of which form natural routes across the Southern Alps. The railway from Switzerland, which passes through the Simplon Tunnel, follows the valley of a small river which enters Lake Maggiore, and thence the line runs on to Milan. Another railway from Switzerland, after passing through the St. Gothard Tunnel, follows the upper valley of the Ticino, and then turns eastward through the town of Como to Milan. **Milan** has, in fact, become a great railway centre on account of its central position in the plain. It possesses a great cathedral, built of the white marble which is quarried in the Apennines. Like Turin, it has a large silk industry.

The Po brings down much sediment, and has made a large marshy delta at its mouth. A little to the north of this delta the River Adige enters the Adriatic. The valley of this river is followed by the railway from Austria, which crosses the Alps by the Brenner Pass, and is guarded by the fortified town of **Verona** on the Italian side. Still farther north along the low coast there is a shallow lagoon, nearly separated from the sea by sand-banks, and on some islands in this lagoon stands Venice.

Venice was founded on these islands that the water might be a protection from attack; but the chief island is now joined to the mainland by a causeway, which carries a railway. This island is divided by one broad canal with a serpentine course, called the Grand Canal, and by many small canals. Traffic is, therefore, generally carried on by boat, though it is possible to walk by means of narrow ways and bridges over most of the city. Venice is noted for its picture-galleries and beautiful buildings, especially its cathedral and the palace used by the dukes who ruled the city in the Middle Ages. In those ages the Venetians were very rich, because they were prosperous traders. They fetched the silks, spices, and gems which were brought from South-Eastern Asia to the eastern ports of the Mediterranean, and then forwarded the goods to cities in North-Western Europe by the Brenner road. Later on this kind of trade declined, on account of the discovery of the route to Asia south of Africa, and the city became poor; but since the cutting of the Suez Canal its trade has improved, and now it draws much profit from the number of tourists who visit it. The chief industries carried on at Venice are fishing and making glass and lace. The port forms the eastern outlet for the produce of the Plain of Lombardy.

Genoa is the western port of the plain; but, unfortunately, it is shut off from it by the Apennines, through which a railway is carried

by tunnels. It stands also on the railway from France which follows the Riviera, and then skirts the west coast (see p. 117). The city has a magnificent harbour, and, like Venice, possesses many interesting old palaces.

THE WESTERN REGION.

This lies between the Apennines and the sea. **The Apennines** stretch through the whole length of Italy, from north of Genoa to 'the toe,' but bend eastward in the middle. They are high mountains, though not so high as the Alps. Parts are covered with poor grass, on which sheep and goats are reared, and parts with forests of chestnuts and other trees; but the lower slopes are often terraced for cultivation. A good deal of marble is quarried in the mountains, especially at Carrara.

The region thus enclosed by the Apennines has a varied surface, low in some parts and hilly in others. The climate is moister than that of the plain, and warmer. The chief productions are olives, wheat, the vine, and in parts oranges and lemons. Many cities famous in the history of the past are situated in this area.

Basin of the Arno.—Florence stands on the Arno, at the head of a fertile valley, and where the Apennines could be crossed by a fairly easy route to Bologna and the Plain of Lombardy. It was a very important city in the Middle Ages, when a beautiful cathedral was built of white, and pink, and dark green marble. It has also splendid picture-galleries, which yearly attract many tourists. Near the mouth of the Arno stands **Pisa**, with another famous cathedral. The chief products of the Arno basin are olive-oil, which is largely manufactured at **Lucca**, and a kind of wheat, from the long straw of which hats are manufactured. Many hats are exported from **Leghorn**.

Rome, the capital of Italy, was founded long before the birth of Christ, on a group of hills which rise above the banks of the Lower Tiber. The hills made the situation secure from floods and rendered defence easier. The position is a good one, because it is fairly central, and is easily reached by routes along the coast and across the Apennines. Formerly the Tiber was navigable for small vessels as far as Rome, but now it is so shallow that the city is no longer a port. The present importance of Rome is due to its being the capital of the country and the headquarters of the Roman Catholic Church. It contains, therefore, the chief palace of the King and the residence of the Pope. The Cathedral

ITALY: RELIEF.

ITALY: RAILWAYS.

of St. Peter's at Rome is the largest Christian church in Europe. Many tourists yearly visit Rome, but the plains around the city are unfortunately low and unhealthy.

Naples, the largest town in Italy, and a great port, stands on a bay famous for its beauty. Coral ornaments are made from the coral obtained off the coast, and a good deal of macaroni is made from the flour of a kind of wheat grown in South-Eastern Italy. The district round Naples is densely populated, for it is very fertile. This fertility is due in part to the fact that the soil is derived from volcanic rocks.

Vesuvius.—A few miles to the south-east of Naples lies the volcano called Vesuvius. Like all volcanoes, this mountain has, in the course of many eruptions, been built up gradually from the melted rock and ashes thrown out of a hole in the earth. Many volcanoes have long periods of inactivity between their eruptions. Centuries ago Vesuvius had been quiet for so long a period that two cities, called Pompeii and Herculaneum, had been built at its foot. In A.D. 79 a noise as of thunder was suddenly heard, and steam issued from the crater at the top of the volcano, with so dense a cloud of dust that for three days the sunlight was obscured. The smoke and gases which came forth were illuminated by the glare of the red-hot rock below, as it poured down the sides of the mountain. The flood of lava and showers of ashes buried the cities, but during recent years their ruins have been unearthed, so that it is possible to walk through their ancient streets. Vesuvius is still subject to eruptions, and even when it is quiet a cloud of steam is generally issuing from it.

SOUTH-EASTERN AND INSULAR ITALY.

South-East Italy has no large towns, though it supports a fairly dense population. The people live by rearing large flocks of sheep, and growing wheat for macaroni. **Brindisi,** the chief port, is the terminus of a railway, which skirts the Apennines and crosses the Plain of Lombardy to Milan. Many travellers going from North Europe to South-East Asia by the Suez Canal prefer to journey by this railway to Brindisi, and to embark there, instead of going all the way round West Europe by water. Mails also are embarked and despatched from this port. Marshes render the shores of the Gulf of Taranto unhealthy in many parts.

Sicily is separated from Italy by the narrow Straits of Messina. In the east of the island rises the great volcano of Etna, which possesses

many cones and is subject to frequent eruptions. Much sulphur, therefore, is obtained from this district, as well as pumice-stone, which is only a kind of lava. The warm climate and fertile soil make the island very productive ; the chief products being wheat, wine, oranges, and lemons. **Palermo** is the capital.

Sardinia, which belongs to Italy, is very mountainous, and a large portion of the island is barren. In some places there are forests, and in others wheat is grown. Iron and lead are mined and exported from Cagliari. Still more iron is found on the island of **Elba.**

COMMERCE.

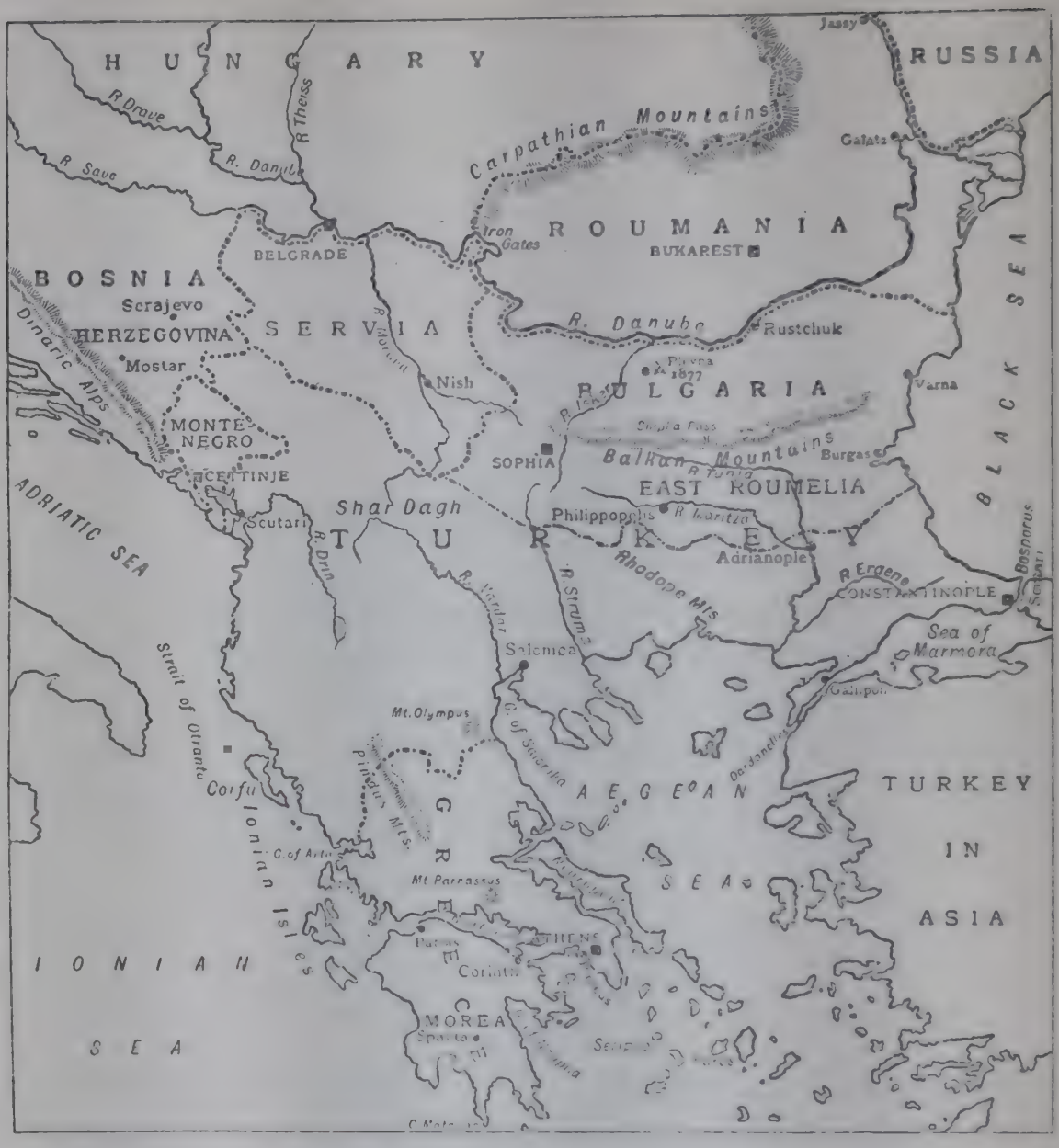
Italy has a good central position in the Mediterranean and many deep ports, so that it carries on a large trade by sea, especially with Britain. Its trade by land is also large, now that railways have been carried through the Alps to the countries of France, Switzerland, and Austria, which adjoin it. On account of the railways which cross Switzerland, Italy's trade with Germany has risen to great importance in recent times. Raw silk is by far the most valuable of its **exports.** Others are silk and cotton goods, fresh and dried fruits, oil, wine, and hemp.

SOUTH BALKAN STATES.

TURKEY.

Relief and Productions.—Western Turkey is crossed by the belt of ranges which border the Adriatic, and, under the name of the Pindus Mountains, extend into Greece. These ranges are very barren, but herds of sheep and goats are reared on the poor pastures. Middle Turkey also is occupied by a mass of mountains, which are treeless and uncultivated ; but wheat, tobacco, silk, and figs are produced in the valleys. These valleys are also important as forming the natural sources of communication, and are the only parts well populated. A branch of the Orient Express Line follows the valley of the Vardar southward to **Salonica,** the chief port on the Ægean Sea. The local supply of wool has encouraged the manufacture of carpets here. Eastern Turkey comprises little beside the lower basin of the Maritza River. The climate is rather dry, and is, though hot in summer, quite cold in winter.

Constantinople, the capital of Turkey, is situated at the southern end of the long, narrow straits called the Bosporus. It stands on a



BALKAN PENINSULA: POLITICAL.

curved inlet of the same, called the Golden Horn, which forms a magnificent natural harbour. It has thus a splendid position for controlling traffic between the Black Sea and Mediterranean, yet, partly through bad government, the trade of the port has never been very great. **The chief exports** are silk, mohair, and figs. Constantinople is the terminus of the Orient Express Line from Paris; and from Skutari another line leads across Asia Minor. The Turks are Mohammedans, and their mosques, ornamented with turrets called minarets, give the city a picturesque appearance. Constantinople contains also the vast palace of the Sultan, who rules over parts of Western Asia as well as Turkey (see p. 138).

MONTENEGRO.

This is a small mountainous little kingdom with similar productions to those of Western Turkey. The capital is Cetigne.

GREECE.

The coast of Greece is much indented, and it is fringed by numerous islands. The Gulf of Corinth, which cuts the country nearly in two, has been connected with the Ægean Sea by a canal. The country is mountainous, but wheat, olives, figs, and grapes are grown in the river-valleys and coastal plains, as well as the small grapes which, when dried, become currants. Raisins and currants are **the chief exports** of the country, and are largely exported from **Patras.**

Athens, the capital of Greece, is noted for the ruins of the beautiful ancient buildings which cover the steep, rocky hill called the Acropolis. The temples on this hill were built of white marble, which is quarried in the country. The modern city lies at the base of the Acropolis, and has a harbour about five miles away.

EUROPE—REVISION.

RELIEF AND RIVER SYSTEM.

Relief.—More than half of Europe is a diversified plain under 700 feet high, which extends over Russia, Southern Sweden, Northern Germany, Denmark, the Low Countries, and North-West France. This is known as the Great Plain of Europe. In Scandinavia and North Scotland there are vast plateaus, and another series of plateaus extends across Central Europe—*i.e.*, the Central Plateau of France, the Vosges, the Black Forest, the Rhine Highlands, and the Plateau of Bohemia.

South of these plateaus lies a series of ranges which include the Cantabrians, Pyrenees, Sierra Nevada, Apennines, Jura, Alps, Carpathians, Balkans, Pindus, and Caucasus Mountains. These ranges were all formed ages ago by the folding or wrinkling of the earth's crust. Owing to the destructive action of water, wind, and ice, these ranges, though still the highest in Europe, have been much worn down, so that it rarely happens that the original upfolds of rock still form ranges, and the original downfolds valleys. The Alps and Apennines partly enclose

1 = Below sea-level. 2 = 0 to 600 ft. 3 = 600 to 3,000 ft. 4 = 3,000 to 6,000 ft.
5 = over 6,000 ft. ..... = hundred-fathom line.

EUROPE: RELIEF. (After the Diagram Co.)

the plain of the Po, and the Alps, Carpathians, and Balkans those of the Danube. Most of Central Spain and Turkey are plateaus. On the maps on pp. 73, 103, and 111, the areas where 'folded ranges' prevail are indicated by vertical lines and the plateaus by oblique.

River System.—Nearly half of Europe is drained by rivers which flow into the Arctic and Atlantic Oceans. The southern and eastern parts of Europe are watered by rivers flowing into the Caspian, Black, and Mediterranean Seas (see p. 125).

CLIMATE AND VEGETATION.

Europe can be divided into the following climatic areas:* (1) **Western Europe,** north of the Mediterranean region. The climate of this area can be broadly described as temperate, equable, remarkably mild in winter for the latitude, and liable to a fair rainfall at all seasons. Near the coasts, and in mountainous parts, the fall is often excessive. This area was originally covered chiefly by forests, and though these have

* For maps, see pp. 3, 4, 5, 7, 329; and for statistics, pp. 339 and 340.

been cut down in the great plains to make room for crops, they still extend over much of Scandinavia and North Russia, besides over the slopes of the central plateaus and ranges. The prevailing trees in the north and on mountains are pines, firs, and silver birches, while oaks and beeches are common elsewhere. The crops which are most common are oats, barley, rye, flax, potatoes, and other root-crops. Wheat and the vine are grown towards the south. In the north are the barren Tundras and vast moorlands, covered with bogs, heather, and poor grass. The summits of the chief ranges are mainly barren or buried under snow.

(2) **The Plains of the Danube and South Russia.**—These regions experience great extremes of temperature, and the rainfall is somewhat slight, and occurs chiefly in summer. The original vegetation was grass, and much of the land is still grass-land, though wheat and maize and other crops are supplanting the grass in many parts. Near the Caspian Sea the rainfall is so slight that the district becomes a desert.

(3) **The Mediterranean Region.**—Here the climate is warm and fairly equable. The rainfall varies considerably in amount in different parts, but everywhere occurs chiefly in winter. The characteristic resultant type of vegetation has been already described (see p. 109).

DISTRIBUTION OF POPULATION.

The chief factors controlling the distribution of population in Europe at present are climate, the relief and fertility of the land, and the distribution of mineral wealth, especially that of coal. From the map on p. 125 it will be seen that the regions of densest population on the mainland of Europe are—(1) an area embracing the fertile basins of the Rhine, Scheldt, Somme, and Lower Seine, and possessing several coal-fields ; (2) an area stretching over much of Central Germany, and extending into Austria, which is also rich in minerals ; (3) the northern portion of Italy, which is extremely fertile.

The least populated regions are—(1) the northern portion of the Continent, where the climate is cold, and the soil relatively unproductive ; (2) the south-eastern portion of Russia, which suffers from drought, and has a salt and sandy soil ; (3) Alpineland and the central plateau of Spain, where agriculture is impossible over large areas. The whole of Russia and the Balkan Peninsula have but a slight population compared with the countries of Central Europe.

For statistics *re* population, see p. 347.

RACES AND LANGUAGES.

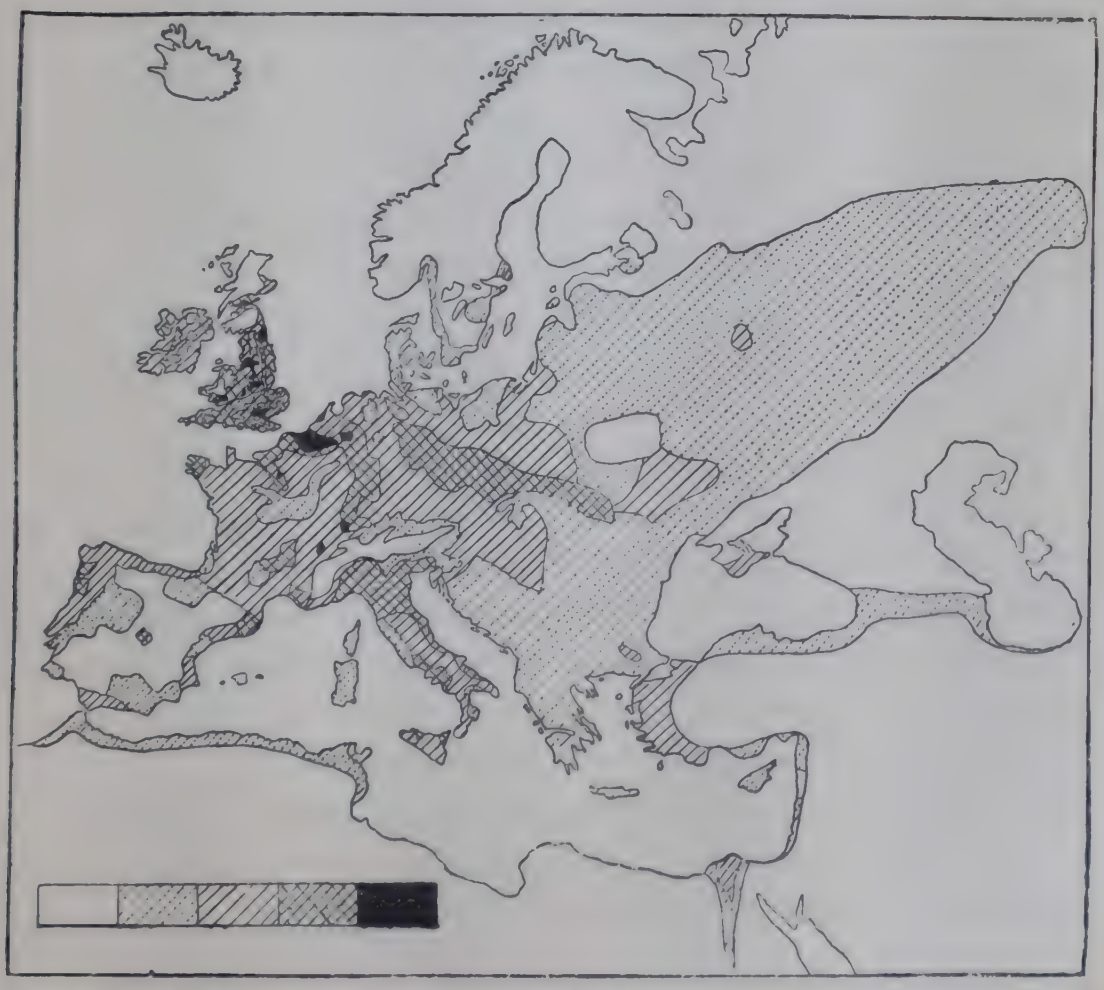
Most of the inhabitants of Europe and the seaboard of the Mediterranean belong to what is called the Caucasian race. People of this race possess the following characteristics: (1) A fair skin—especially in the case of the northern peoples, for those of southern regions are much more olive in hue, and some are even brown. (2) Straight-set eyes, and of varying hue—blue, grey, brown, and black. (3) An abundance of hair, often long and wavy, and varying in colour from yellow to red, brown, or black. The men have generally beards. The Lapps, who live in the North of Scandinavia, and a few wandering tribes in the South-East of Russia, belong to the Mongolian race. This race is distinguished by the round heads and slightly oblique eyes of its members, who are, on the average, shorter than those of the Caucasian stock. Languages of Mongolian origin are also spoken by the Finns, the Huns, and the Turks.

The languages spoken by the remaining inhabitants include—(1) Those of Greek or Latin origin, which are predominant in Portugal Spain, Italy, Greece, France, and part of Switzerland and Austria. (2) Those of Teutonic origin, mainly spoken in England, Germany, Holland, Scandinavia, Denmark, and the western part of the Austrian Empire. (3) Those of Slavonic origin, which prevail in Russia, Bohemia, and parts of the Balkan Peninsula. (4) Celtic languages, which are spoken by the inhabitants of Brittany in France, and by the native Welsh, Irish, and Scotch Highlanders in the United Kingdom.

COMMERCE.

The magnitude of the trade of an area depends mainly on the number and character of the inhabitants and on the extent and nature of their wealth and requirements, but also on the facilities that exist for exchanging goods, both within the area and with countries outside. In these last respects Europe is favoured in its position between the highly productive regions of South-Eastern Asia and the recently developed resources of North America, in its large areas of fairly level land over which it is easy to construct roads and railways, its many navigable waterways, long coastline, and good harbours. With an area about equal to one-thirteenth of the land world, not reckoning Polar regions, Europe possesses a population equal to nearly a quarter of the world's

EUROPE: RIVER SYSTEM.



Under 64. 64-128. 128-256, 256-512. Over 512. Persons per square mile.

EUROPE: DENSITY OF POPULATION

total, and has an external trade equal to about three-quarters of that of all the continents put together.

Besides possessing these vast commercial relations with the rest of the world, some European nations have acquired great political power in other continents by means of colonization and conquest; thus Africa is controlled mainly by Britain, France, Germany, Portugal, and Belgium, and Asia largely by Russia, Britain, Turkey, and France, while Australia and Canada are British possessions.

Trade and Tariffs.—The countries in Europe which have the greatest external trade, in order of the value of this trade, were, in 1909, the United Kingdom, Germany, France, Holland, Belgium, Russia, Austria-Hungary, and Italy. To some extent the amount of trade between these countries has been artificially hampered by the creation of high tariffs—*i.e.*, duties on imports, which have generally been levied with the idea of protecting home productions and industries from foreign competition, as well as thereby to obtain a revenue. This protective policy is so strong a feature in Russia that manufactured articles imported from this country are taxed on the average 131 per cent. on their value, and in a lesser degree it is adhered to by most countries. On the other hand, the United Kingdom has 'free trade,' and small countries like Holland, that are obliged to depend largely on foreign supplies, levy only very slight duties. Since goods are exported to pay for goods imported, we might expect an equality in the value of the exports and imports of any country, but as a matter of fact the imports of most European countries are in value in excess of their exports. This is due to their receiving yearly interest on capital previously lent, or payment for shipping and other services they have rendered to various nations.

On the whole the trade between European countries has increased very rapidly during the last century, mainly on account of the introduction of steam-power, the improved facilities for the transportation of goods, and the consequent cheapening of freight rates. Water-carriage is cheaper than land-carriage, but the latter is quicker, and sometimes saves 'break of bulk'—*i.e.*, the expense and risk attendant on handling goods at two ports, as well as at the places of departure and arrival.

Chief Railway Routes.—For railway traffic it is a great advantage when the railway gauges in the different countries are the same, so that trains can be run right through. This is the case with all the

chief European countries, which have the same gauge of 4 feet $8\frac{1}{2}$ inches, save Russia, Spain, and Portugal. At present the most important international railways in Europe are : (1) The Orient Express Line from Paris to Constantinople, via Strassburg, Munich, Vienna, Budapest, and Belgrade. The time occupied in going from London to Constantinople by this route is about seventy-one hours, as against ten days by sea direct. (2) The Indian mail route from Paris to Brindisi, via the Mont Cenis Tunnel, Turin, and Bologna. From London to Brindisi by this route takes about fifty-eight hours. (3) The Northern Express from Paris to St. Petersburg, via Cologne, Berlin, and Warsaw, which takes about forty-nine hours. (4) The lines from the Dutch and Belgian ports into Italy, via the Rhine valley, Lucerne, and the St. Gothard Tunnel, or via the Simplon Tunnel. The journey from Antwerp to Milan takes about twenty-five hours. (5) The railway from Berlin into Italy, via Munich and the Brenner Pass. From Berlin to Verona takes about ten hours.

Differences in Time.—European nations are closely knit together by means of telegraphs, as well as by roads and railways, and international efforts have been made to meet the inconvenience in travelling due to the fact that different countries keep different time. Owing to the earth's rotation, the time at which noon occurs varies along different meridians of longitude—the word 'meridian' meaning 'noon,' and signifying that all points on that half of the circumference of the circle which is turned to the sun have noon at the same time. Time varies, in fact, one hour for every 15° of longitude, since the earth revolves 360° in twenty-four hours ; and since this revolution is from west to east, places in the east have their noon before those in the west. Apparently, therefore, time is lost in travelling eastwards, and gained in going westwards. Places generally keep the time of the capital of the country they are in, but Mid-European time, which is that of 15° east of Greenwich, is used in Scandinavia, Germany, Austria-Hungary, Italy, and Switzerland. French time is now the same as in England.

ASIA.

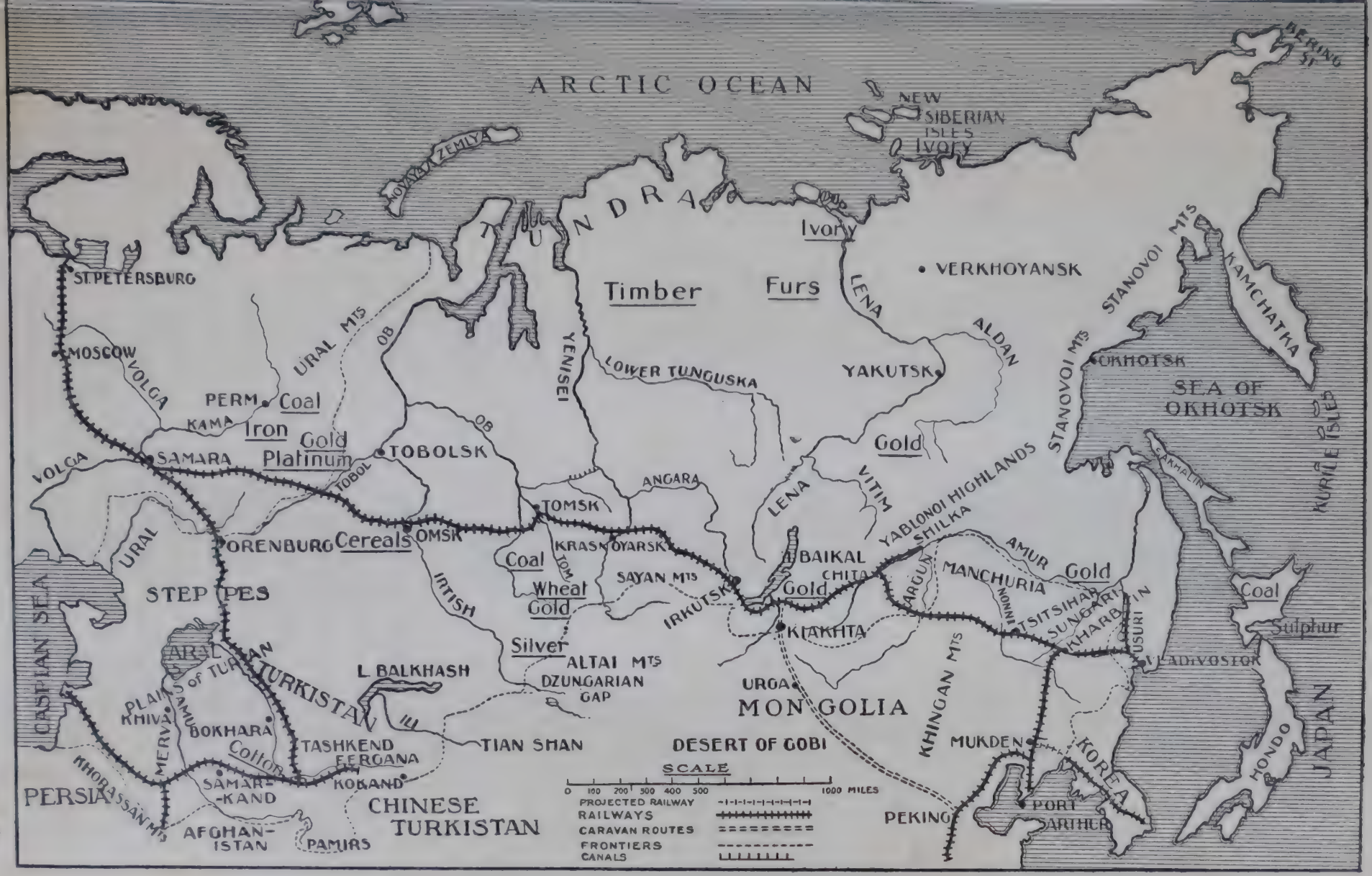
ASIATIC RUSSIA.

Asiatic Russia embraces more than one-third of the total area of the continent. From a consideration of the structure, it falls into the following regions: (1) The Tundras, or low barren wastes that skirt the Arctic Ocean. (2) The rest of Siberia east of the Yenisei, which possesses a diversified and mainly elevated surface. (3) The plain of Western Siberia, which is drained to the Arctic Ocean. (4) The plain of Turkistan, with its upland girdle, which is an area of inland drainage. (5) The diversified region of Trans-Caucasia, which, though politically attached to Europe, seems naturally to form part of Asia. The structural contrast between Eastern and Western Siberia is partly overshadowed by the continuity of the forest-belt, which extends over the middle portion of Western Siberia, and over nearly all Eastern Siberia, south of the Tundras.

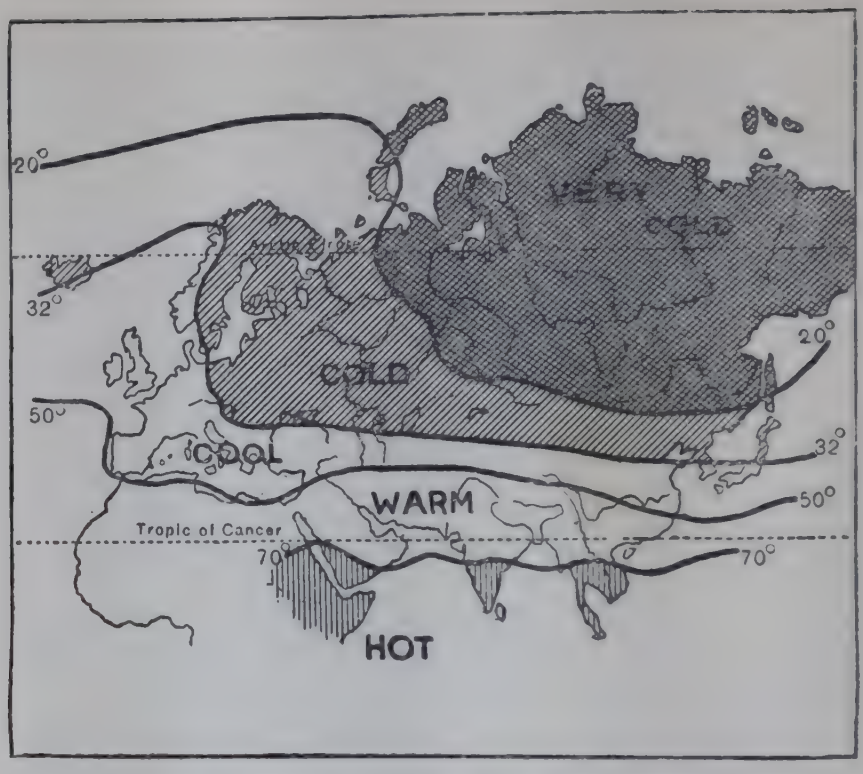
The climate of Asiatic Russia naturally varies with the latitude, but as the country lies within the Frigid and cool Temperate Zones, and slopes to the north, the temperature is low for most of the year, and in winter the cold is terrible. The north-east coast suffers, moreover, from a cold current which flows from Bering Straits. The great range of temperature, which is everywhere characteristic of the country, is due to its remoteness from the influence of ocean winds, and this fact, and the cold in the north, accounts for the slight rainfall. As in Russia, the rain falls chiefly in summer (see maps on pp. 130, 131, 133, 136, and 137).

THE TUNDRAS.

Scenery.—Though this region is hilly in places, the average elevation is low, and this, combined with the frequent flooding of the rivers which cross it, has converted large tracts into swamps dotted with lakes, and has encouraged a prolific growth of mosses. Some of the swamps are overgrown with reeds, or thickets of short willows; while elsewhere bog moss, reindeer moss, and lichens form a thick, uneven covering over large areas. In places where the soil is slightly drier there are forests of dwarf birches, which only attain a height of about a yard, and of such plants as crowberry, cranberry, and whortleberry. Large trees are confined to the sand-banks which flank the rivers, and there larch, willow, and alder occur. In summer the region is gay with many Alpine flowers, but for most of the year the ground is frozen and buried



ASIATIC RUSSIA: POLITICAL AND ECONOMIC.

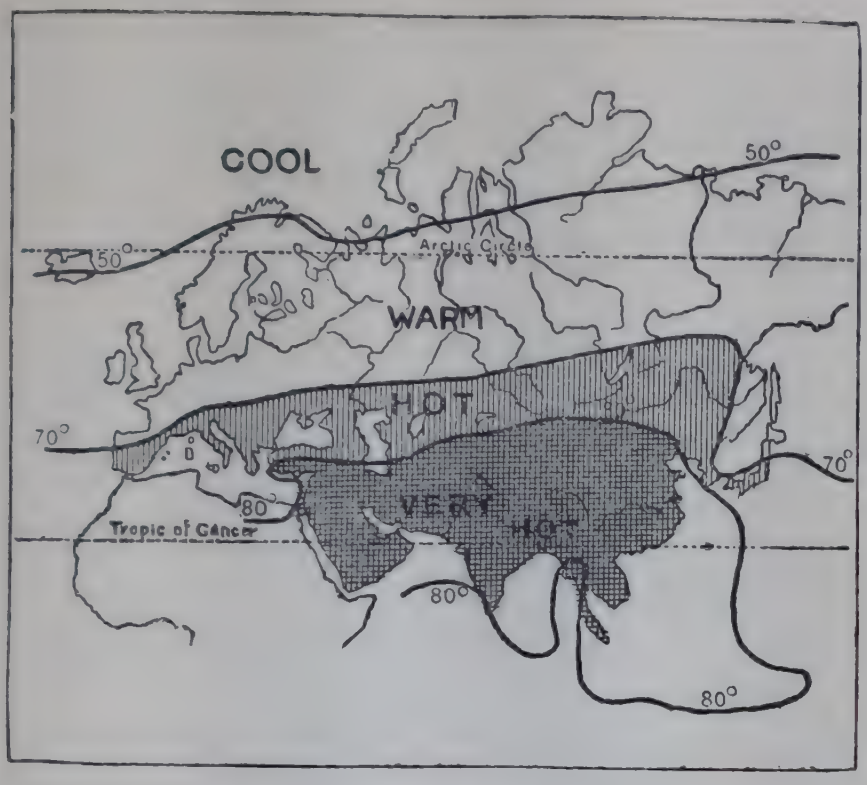


ASIA: ISOTHERMS FOR JANUARY.

under snow. Even in summer the soil only thaws to the depth of a foot or two, and cultivation is, of course, impossible.

Fauna.—Ages ago the Tundras must have had a much warmer climate, for the mammoth roamed over these plains, and his tusks, preserved in the ice, still furnish ivory for commerce. At present, though the region is rich in fish, and birds and insects abound during the summer, the only important animals are the reindeer, polar bear, small Arctic fox, and various rodents. The reindeer has been domesticated, and forms the chief wealth of the tribes who inhabit this region, as in Lapland (see p. 94).

The inhabitants comprise various tribes of Mongolian race. Not only the poorer classes, who are only hunters and fishers, but even the richer, who are also herders of reindeer and own dogs, are obliged to live a nomadic life. Game and reindeer moss are soon exhausted in a given area, and have to be sought elsewhere; while the cold forces the tribes to wander southwards in winter, and the mosquitoes induce many to seek high regions in late summer. The usual dwelling-place is a movable tent formed of birch-bark or skins stretched over a framework of poles, with a hole at the top to serve as a chimney. Furniture consists of beds made of skin and dried moss, mats, and a few weapons and utensils, while reindeer-skin provides the material for clothing.



ASIA : ISOTHERMS FOR JULY.

Food consists chiefly of reindeer-flesh and fish, which is fresh in summer and dried in winter. Sugar, tea, and a kind of brandy, are obtained from traders in exchange for skins and furs. These are chiefly the skins of animals hunted in the outer fringe of the southern forest-belt ; but the seals caught on the Arctic shores supply not only skins, but train-oil. The fur-coated seals are found only in the small isles in the Bering Sea most of which belong to the United States.

THE SIBERIAN FOREST.

Scenery.—This forest is on the whole monotonous in aspect; for, though the trees vary with latitude and soil, wide areas are dominated by the same species, and, despite the glory of the autumn tints, the general impression is one of gloom. In the north the prevailing trees are spruces, firs, pines, and larches, with aspens here and there ; while the river-valleys are clothed with willows. Farther south poplars and birches prevail ; while throughout the whole area there is a considerable undergrowth of berry-bearing shrubs. The forest is most easily penetrated in winter, when the numerous swamps are frozen, and the irregularities of the surface covered with a thick layer of snow that can be traversed on snow-shoes. Wide areas of the forest are sometimes devastated by fire ; but no important lumber trade exists as yet.

Fauna.—The chief present value of the forests lies in the shelter they afford to game and fur-bearing animals. These include the stag, elk, wolf, fox, bear, lynx, squirrel, hare, martin, ermine, and sable, as well as grouse, plover, and wild swans. The most valuable furs are those of the black and silver fox, sable, and ermine.

EASTERN SIBERIA.

This consists, south of the Tundras, of an elevated region bordered by the Stanovoi Mountains on the east, and rising in the south to the highlands around Lake Baikal. The greater part of the surface is covered by the forests already described, and is drained by the Amur, Lena, and eastern tributaries of the Yenisei.

The **Amur,** which is called Argun in its upper course, rises in Mongolia, and is navigable nearly to the point at which it is crossed by the Siberian Railway. In its lower course it is navigated by sea-going vessels, but its mouth is closed by ice for half the year, and is obstructed by a bar. The Amur and its tributary, the Usuri, for the frontier between Siberia and Manchuria. The Usuri is navigable, and its course is followed by a railway which, on account of the northward direction of the Lower Amur, conveys much of the trade of that river south to the port of **Vladivostok.** This is one terminus of the Siberian Railway, and is a fortified naval station.

The **Lena** rises close to Lake Baikal and after a circuitous course flows across an immense delta into the Arctic Ocean. **Yakutsk** stands on a frozen alluvial flat on the west bank of the Lena at its great bend. The town consists chiefly of small dilapidated houses, a few official residences, and a prison. It is a centre of the fur trade.

The **Yenisei** rises in Mongolia, and enters the Arctic Ocean by a long estuary after a remarkably straight course. It is navigable from above Krasnoyarsk, where it is crossed by the Siberian Railway, and is connected by a canal with the Ob. The Angara tributary of the Yenisei forms the outlet of **Lake Baikal.** This lake occupies two long parallel troughs of extraordinary depth, and has a mean breadth of about thirty-five miles. It is regularly crossed by steamers in summer, but is subject to storms and fogs, and from January to May it is frozen. The water is fresh, and the salmon fisheries are important. Rapids occur on the Angara where it leaves the lake in a series of picturesque gorges, and **Irkutsk** stands at the head of navigation. This town is the capital of

1. Under 600. 2. 600 to 6,000. 3. Over 6,000. Height in feet.
..... = Hundred-fathom line.

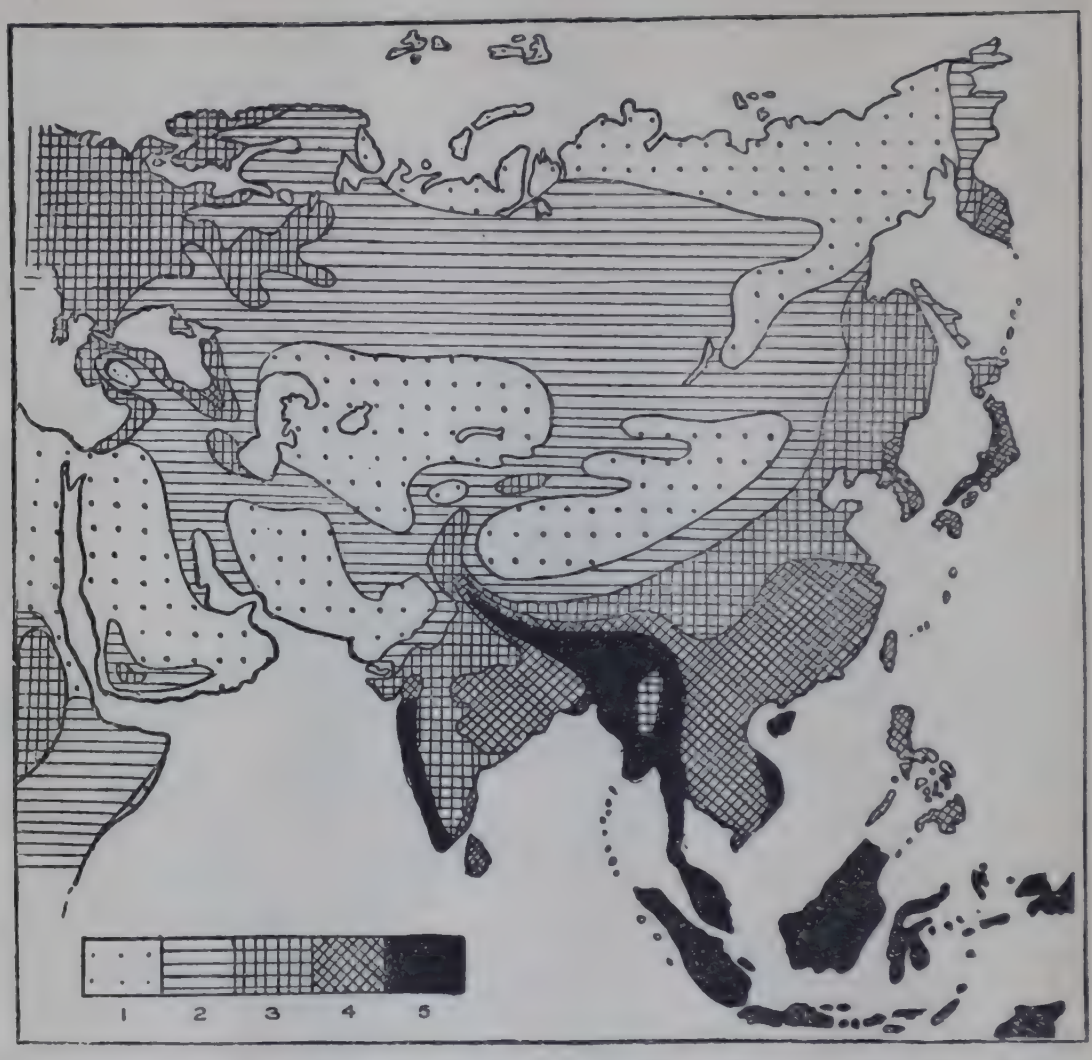
ASIA: RELIEF. (After the Diagram Co.)

Eastern Siberia, and an important trading centre, which has gained much benefit from the opening of the Siberian Railway.

East of Lake Baikal is **Kiakhta,** where he caravan route from China enters Siberia, but its trade is less important than formerly. The Trans-Baikal region is noted for gold, and a little coal is mined on the forested island of **Sakhalin.** The southern half of this island belongs to Japan, and the rest is used as a convict settlement by the Russians.

WESTERN SIBERIA.

This is a great plain drained by the **Ob** and its tributaries. The Ob is navigable for most of its course, and is very wide, especially at times of flood. Its chief tributary is the Irtish, which rises in the Altai Mountains and passes through the important Dzungarian Gap. On the Irtish stand **Omsk,** where the river is crossed by the Siberian line, and **Tobolsk,** where it is joined by the Tobol tributary.



1. Under 10. 2. 10 to 20. 3. 20 to 40. 4. 40 to 80. 5. Over 80. Rainfall in inches.

ASIA: MEAN ANNUAL RAINFALL. (After Herbertson.)

Tomsk.—The capital and best-built town of Western Siberia is Tomsk, which stands on the Tom tributary of the Ob, a little distance north of the point where the Tom is crossed by the Siberian railway, with which the town is connected by a branch line. Tomsk is a depot for the gold mined in the Altai Mountains. Silver and lead also are worked in these mountains, and there is a large coal-field in the basin of the Tom; but the coal is of inferior quality. Tomsk possesses a University, and is becoming an agricultural centre.

Siberian Trade.—Those parts of Western Siberia which have been opened up to Western markets by the Siberian Railway are being brought rapidly under cultivation. Wheat, the chief crop, suffers occasionally from the inadequate supply of rain, which falls mainly in early summer; but it generally does well. Rye, oats, and potatoes are also grown, and cattle are reared on the grass-lands, which still occupy most of South-West Siberia, and form part of the Steppes.

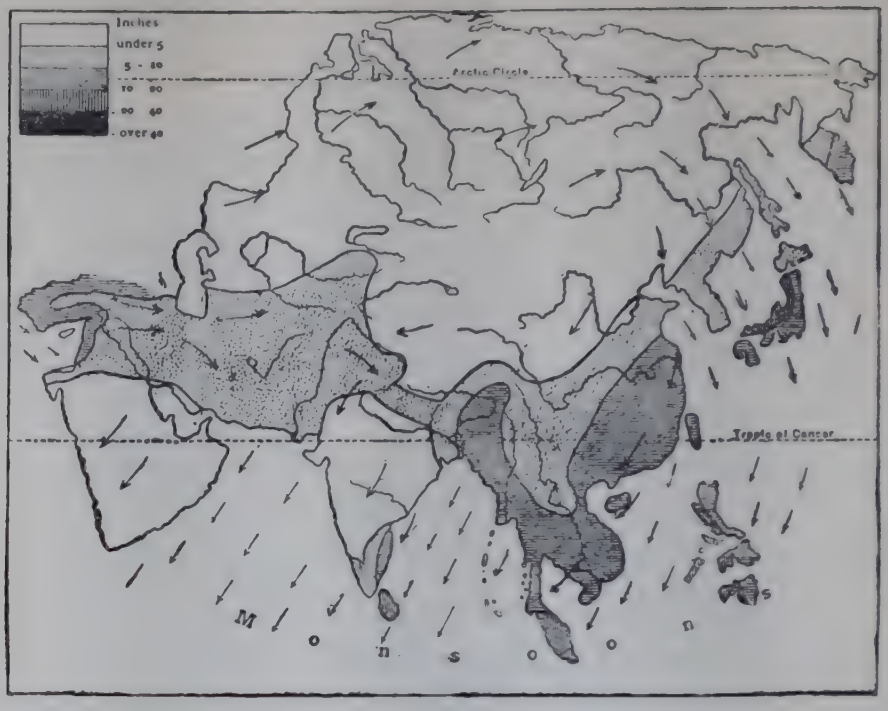
THE STEPPES.

Scenery.—The term 'Steppe' is a Russian word applied to all treeless, yet not desert, districts, and therefore covers a fair variety of scenery, although over large areas the landscape may be monotonous. The prevailing aspect is that of grassy, undulating plains, or broad valleys hemmed in by hills, and watered by meagre streams which flow into salt lakes. These lakes are often surrounded by a girdle of salt-coated soil, and in some districts all the hollows are filled up with salt produced by the evaporation of sheets of water no longer existing.

Vegetation.—In such saline regions vegetation is limited to a few low bushes; but elsewhere grass predominates, varied by reeds and rushes in the marshes, while flowers abound in the spring. At that season there is a regular succession of tulips, lilies, forget-me-nots, honeysuckle, vetches, and other flowers, which sometimes colour the Steppe to the horizon. These, however, soon wither under the summer sun, and even the grass is burnt to a grey-yellow hue before the autumn. During the winter the whole region is buried under snow and swept by fierce snow hurricanes. The snow begins melting in April; and this moisture, together with the early summer rains and warmth, accounts for the rapid growth of the grass and flowers at this season.

The inhabitants of the Steppes belong to many different tribes, but all are of Mongolian stock, and lead very similar lives. Life is dependent on the rearing of herds of camels, horses, cattle, sheep, and goats, and is therefore perforce nomadic from May to November, in order that the animals may obtain sufficient nourishment. During the summer, the dwelling-place is a tent made of expanding lattice-work, and covered with felt manufactured from wool. These tents can be easily taken down, folded up, and carried on the backs of camels. They are furnished with carpets, rugs, and domestic utensils which, being made of leather, escape breakage in transport. In winter, when a settled life is necessary, huts are constructed of reeds and plaited willows for the men, and shelters for the animals, which are fed on hay stored for the purpose.

The usual clothing of the Steppe-dweller consists of a long fur or sheepskin coat, wide trousers, a girdle, a fur cap, and high leather boots. The flocks furnish also the staple articles of diet—flesh, butter, and milk, both fresh and fermented. Cereals and tea also are obtained from travelling merchants.

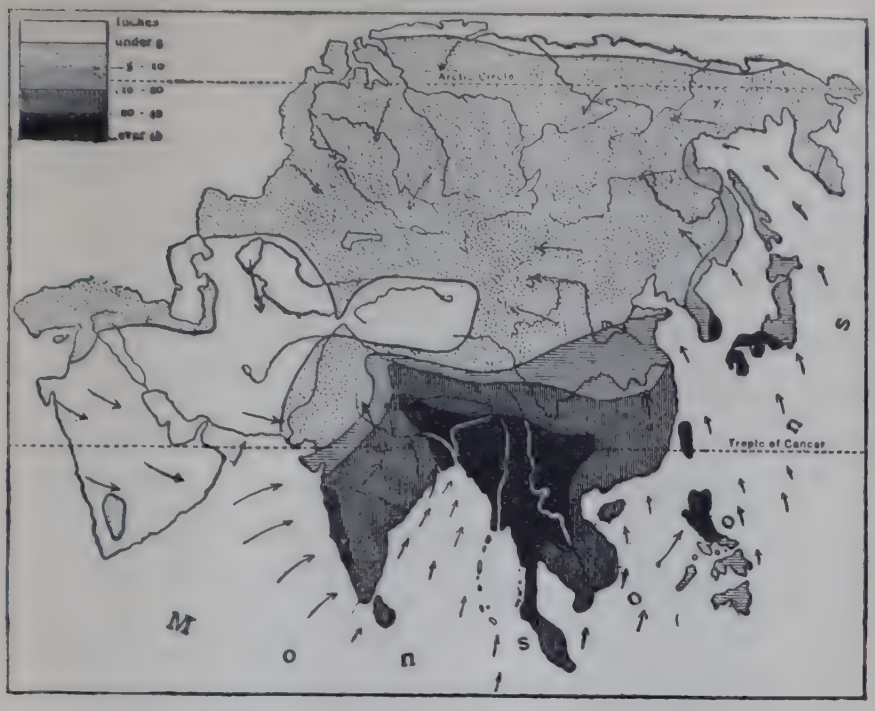


ASIA: WINDS AND RAIN, NOVEMBER TO APRIL.

WESTERN TURKISTAN.

This consists partly of a plain, which merges on the north into the plain of South-West Siberia, and partly of a series of elevated regions. The latter rise on the south to the mountains of Khorassan and the Hindu Kush, and on the east to the Pamirs and Tian Shan Range. The climate of the plain is continental in temperature, and is marked by deficient rainfall. Most of the south and west consists of a sandy desert. The region is occasionally desolated by terrible dust-storms, and the sand is encroaching on districts where cultivation was formerly possible. In the east the soil is clayey, but still barren; while on the north stretch saline wastes, dotted with numberless lakes and crossed by small streams, that disappear in the ground or lose their waters by evaporation. Nevertheless, fair numbers of camels, horses, cattle, and sheep are reared by the Kirghiz and other tribes.

Rivers.—The plain is drained to the **Sea of Aral,** which, like Lake Balkhash, is brackish, but full of fish, and formerly of greater extent than now. It is studded with isles, and very shallow—on the south-east little more than a flooded swamp. Two large rivers, which owe their origin to the snows and glaciers of the Tian Shan, enter this



ASIA: WINDS AND RAIN, MAY TO OCTOBER.

lake—the **Syr** and the **Amu.** Both are rapid and deep in their upper courses, and bring down a large quantity of silt in May and June, when the snows are melting on the mountains. As they proceed across the desert, they diminish in volume, partly because their waters are diverted for irrigation or lost by evaporation, and partly because they send off branches, which disappear in the sand. Both rivers are navigable for shallow craft throughout most of their courses.

The banks of the Lower Syr consist of reed-covered swamps, and its vast marshy delta is the home of many wolves, wild boars, and deer, as well as of swarms of mosquitoes. Its upper valley is known as the **Fergana,** and here, by means of careful irrigation, a great deal of cotton is grown, as well as maize, wheat, flax, tobacco, the mulberry for the silkworm, and such fruits as grapes, apples, peaches, etc. These crops suffer occasionally from swarms of locusts, but otherwise prosper on the rich black soil of the district. This soil also occurs in the valley of the Ili, which flows into Lake Balkhash.

Towns.—Kokand and **Tashkent** owe their existence to the Syr, though the latter is at some distance from the main stream. Kokand is a market for the flocks and animal products of the Steppes. Tashkent is the largest town in Asiatic Russia, excluding Trans-Caucasia, and capital of Western Turkistan. The streets are wide, and the flat-

roofed houses are surrounded by gardens. The inhabitants manufacture cotton, metal, and leather goods. From Tashkent a caravan route, now followed by a railway, runs north of the Syr to Orenburg on the Ural ; while the town is connected, by a line running southwards, with the Trans-Caspian line, which terminates just beyond Kokand.

The **Trans-Caspian** line gains much from the supplies of naphtha found near the shores of the Caspian, and used as fuel. The tendency of wind-blown sand to obstruct the track is a serious menace to traffic, but is held in partial check by screens of low shrubs planted along the line. West of Kokand the line passes through Samarkand, Bokhara, and Merv, towns on irrigated oases, which have had eventful histories in the past. **Samarkand** taps the upper course of the same river that ceases in the oasis of Bokhara, and so tends to profit by the water-supply at the expense of the latter. The town is surrounded by a high wall, and possesses a fine citadel, now used as barracks.

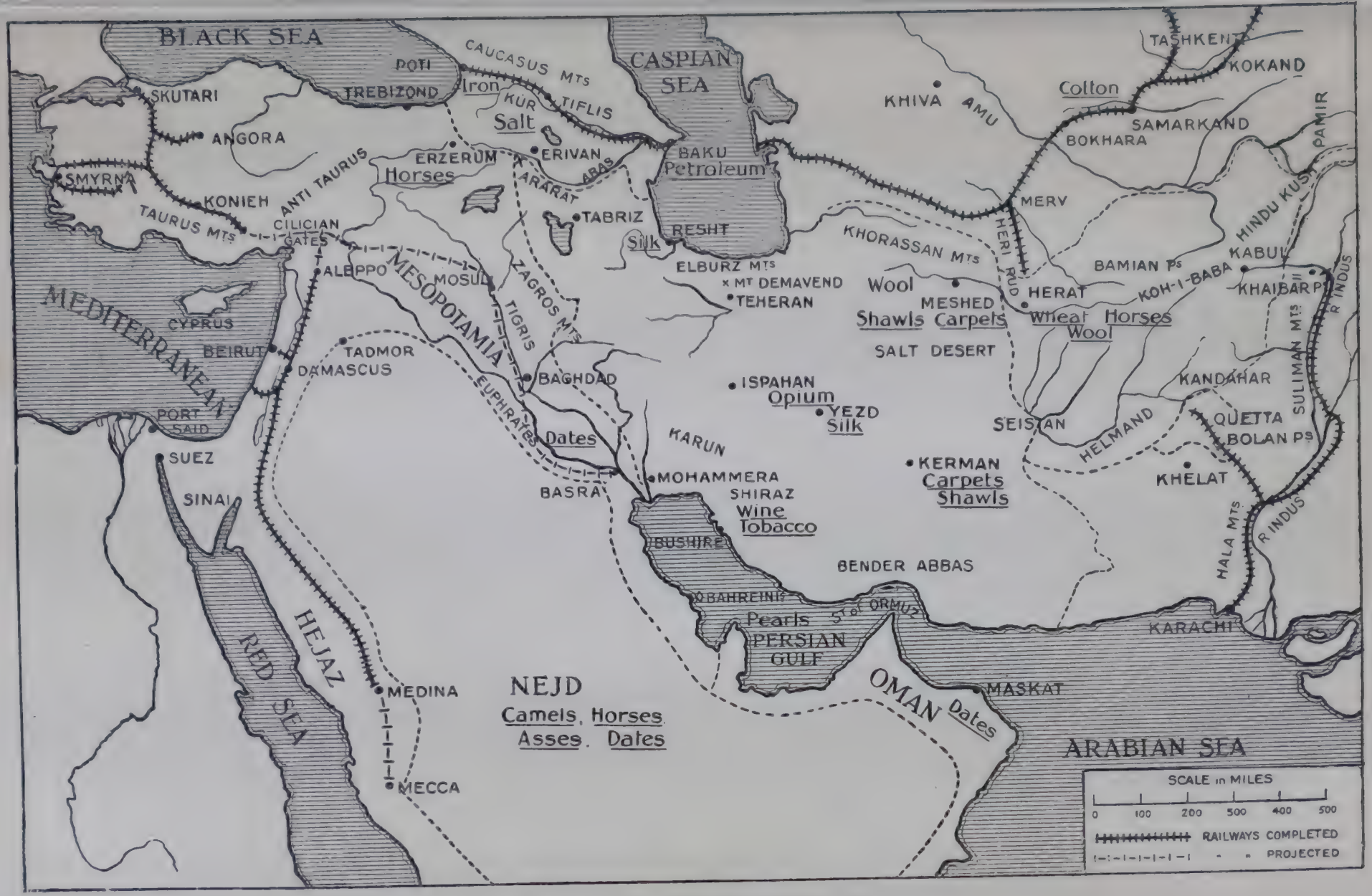
Bokhara is also enclosed by a wall, in which there are twelve gates. It contains a large number of mosques, and has important bazaars filled with local produce and manufactures—*e.g.*, cotton, silk, rice, sheep-skins, dried fruit, and carpets. **Merv** has an advantageous position on a branch-line which has been carried southward towards Herat in Afghanistan. North of Merv lies **Khiva,** on an oasis created by water from the Amu. Cotton and silk are produced here, but the place is less important than formerly. The rulers of this oasis and that of Bokhara are partly independent of Russian control.

Trade in Western Turkistan is chiefly carried on with European Russia by means of the Trans-Caspian Railway and the line to Orenburg. **The chief exports** are live-stock, raw cotton, silk, hides, and black lamb's-wool—*i.e.*, astrakhan.

TURKEY IN ASIA.

This consists of—(1) the plateau of Asia Minor ; (2) part of the plateau of Armenia ; (3) the diversified plateau of Syria ; (4) the plain of Mesopotamia ; (5) certain coastal districts of the Arabian Peninsula.

The **climate** of most of Turkey in Asia is of the Mediterranean type, both as to temperature and the seasonal distribution of the rainfall, which occurs chiefly in winter. The rainfall is slight, save along the mountainous western seaboard, and rapidly diminishes towards the interior.



South-Western Asia: Political and Economic.

ASIA MINOR AND ARMENIA.

Asia Minor is a plateau flanked by the Pontic Range on the north, the Anti-Taurus on the east, and the Taurus on the south. The western coast is fringed with islands, and much indented, the sequence of inlet and promontory reflecting the east-to-west direction of range and valley behind. **Armenia** is a higher plateau to the east, which culminates in Mount Ararat. This is an extinct volcano, and volcanic rocks predominate in the east and centre of Asia Minor; but elsewhere the prevailing rock is limestone.

Rivers.—The Euphrates, Tigris, and Kur, with its tributary the Aras, which forms the boundary between Persia and Trans-Caucasia, rise on the Armenian Plateau. The Aras drains a large lake in Russian territory; and two other large lakes, without outlets, stand, one on the Persian, and the other on the Turkish, portion of the plateau. There are also several lakes in Asia Minor, some containing saline and some fresh water. The porous nature of the limestone in Asia Minor has caused some rivers to disappear underground; while the ranges which bound the plateau have forced others to cut deep gorges through them in order to reach the sea. These ranges also cut off rain from the interior of the plateau; and thus the rivers, being shallow in their upper courses and rapid in their lower, are useless for navigation.

Productions.—The seaward slopes of the ranges are forested; the Pontic range with deciduous trees and orchards, and the Taurus Mountains with conifers. Cultivation is possible on the plateau where irrigation can be employed; but most of Asia Minor consists of poor grass-land, on which herds of sheep and goats are reared. The wool of the former furnishes the material for Turkish rugs and carpets, while the Angora breed of goats supplies mohair. Wheat and barley are cultivated in places, but the raisins, cotton, opium, figs, tobacco, and olives, which are exported, come chiefly from the western valleys. Other exports are valonia—a species of acorn-cup used in tanning—and silk, which is produced near the Sea of Marmora, and manufactured at **Brussa.**

Towns.—Population is densest in the western portion of Asia Minor, and on the isles of the coast, where sponge-fishing is an important industry. The chief town is **Smyrna,** which possesses a fine natural harbour, and is the focus of three railways running into the interior, one of which joins the **Baghdad line** (see p. 142) from Skutari, which has been

carried west of the **Cilician Gates,** a deep gorge which has served for long centuries as the route across the Taurus Mountains. The chief port on the Black Sea is **Trebizond,** from which an important route runs east to **Erzerum.** To the latter town routes converge both from Persia and the south, so that it has become an important centre both commercially and strategically.

Races.—Various races dwell in Asia Minor; but the Mohammedan Turks, who form the present ruling class, have done little to improve the country. On the west coast, Greeks are in the majority, and have monopolized the higher professions, and largely control the trade of Smyrna. The inhabitants of Eastern Asia Minor and Armenia are, for the most part, Armenians and Kurds. The **Armenians** are an intelligent Christian people, who have proved very successful in agriculture and trade, but have suffered much persecution from the Kurds, who are Mohammedans and of warlike nature. The chief occupation of the **Kurds** is breeding horses and goats, and their life is nomadic.

SYRIA.

This consists chiefly of a plateau, which nearly reaches the Mediterranean in the north, but on the south of the promontory formed by Mount Carmel leaves a coastal plain. The plateau is divided into an eastern and western portion by the deep valley followed by the Orontes in the north and the Jordan in the south. North of the Jordan, this valley is flanked by the Lebanon Mountains on the west, and the Anti-Lebanon range, which terminates in Mount Hermon, on the east. South-west of the Sea of Galilee is the fertile though boggy plain of Esdraelon, which extends to the Bay of Acre, and thus cuts the western plateau in two. Southern Syria is generally known as Palestine. On account of their great historical importance, the following regions deserve special consideration:

The Northern Seaboard, which was inhabited by the Phœnicians in ancient times. This seaboard is diversified by rocky promontories formed of spurs from the Lebanon Range lying behind, and these, by rendering land communication difficult along the coast, explain the slight political cohesion of the Phœnician cities that arose here. The two most noted of these cities were Tyre and Sidon. The inhabitants of these and other Phœnician cities grew wheat in the valleys and cultivated olives on the hill-slopes. They also cut down many of the forests which covered the mountains—notably the cedars of Lebanon—for use in shipbuilding, and as an article of commerce. In time the Phœnicians

TURKEY IN ASIA: POLITICAL AND ECONOMIC.

became expert seamen, making long voyages even into the Atlantic in search of raw materials for the industries they pursued, and planting colonies along the shores of the Mediterranean. They were skilled metal-workers, and sought for copper, tin, silver, and lead ; while their textile industry was rendered more valuable by the purple dye obtained from two sorts of shell-fish. The Phœnicians held a favourable position between the early civilized nations of Mesopotamia—*i.e.*, Assyria and Babylon—and Egypt ; for trade was forced northwards to cross the Syrian desert where it is narrow. To-day the chief port on the coast is **Beirut,** which is connected by rail with Damascus.

The Maritime Plain is composed of recent deposits, and mainly of sand, which is brought by a current from the mouth of the

Nile, and is rapidly encroaching inland. The coast-line is singularly regular, and the mouths of all the shallow rivers which cross the plain are obstructed by bars. Hence there are no natural harbours, and the best port—**Jaffa**—can still be approached only in small boats across a belt of surf. The town is noted for its export of oranges, and is now united by rail with Jerusalem. In ancient days the plain formed a natural highroad for both armies and caravans between Egypt, on the one hand, and Phœnicia, Assyria, and Babylon, on the other.

The Western Plateau extends from the plain of Esdraelon to the hilly desert country south of Bir es Seba (Beersheba), a distance of about 90 miles, and averages about 30 miles in width between the maritime plain and the Valley of Jordan. The northern portion, which formed most of the ancient province of Samaria, is more accessible than the southern, which was called Judæa. The latter has generally been approached from the coastal plain by one or other of the valleys, which form natural routes inland; and the railway from Jaffa to Jerusalem utilizes one of these valleys for part of its course. The upper courses of the rivers are dry torrent-beds for most of the year; and, save for a few pools, the inhabitants of the plateau are dependent on wells and cisterns for their water-supply. The plateau is composed of limestone, and, owing to the porous nature of this rock, the somewhat scanty rainfall, the neglect of the ancient terraces built on the hill-sides to keep the soil from being washed away, and the destruction of timber, which had the same effect, it is now mainly a stony moorland. Here and there are tracts of pasture and fields of corn, but fertility is chiefly confined to the valleys, where olives, figs, and the vine are cultivated.

Jerusalem, the capital of Palestine, has a central and fairly secure position on the spurs of some hills, but possesses no other natural advantages. It is a walled city, divided into separate quarters for the Christian, Jewish, Moslem, and Armenian inhabitants. The great Mosque of Omar is said to occupy the site of Solomon's Temple, and the city is yearly visited by numerous pilgrims and tourists, drawn thither by its sacred associations.

The Valley of the Jordan.—This valley is of extraordinary depth, especially in the south, where the bottom of the Dead Sea is nearly half a mile and the surface about a quarter of a mile below sea-level. The word **Jordan** means 'rusher,' and the river is a rapid, muddy torrent, of no use for navigation, and shallow enough to be forded at some points.

It derives its waters from Mount Hermon, and is liable to flood in April, when the snows are melting. After passing through the Sea of Galilee, a fresh-water lake abounding in fish, it flows in a sinuous course at the bottom of a trench in the floor of the valley. On account of the hot atmosphere in this valley, vegetation is rank, especially near the river-bank; and the region has long been frequented by wild beasts. It is too unhealthy for habitation, and the only town existing there in ancient times was Jericho, which is now reduced to a few mud-huts. The **Dead Sea** is so salt that no fish can live in it, and its shores are salt swamps, beds of gravel, or barren cliffs.

The Eastern Plateau.—This forms fair pasture-land in the west for the flocks of the Arabs; but as the rainfall diminishes eastward, so the pastures fade away into the Syrian Desert. The prevailing limestone is overlaid in the district of **Hauran,** east of the Upper Jordan, by fertile volcanic basalt, which has rendered this area noted for wheat. **Damascus,** the capital of Syria, stands at the western edge of the desert, amid fields and orchards irrigated by the waters of the Barada—*i.e.*, the ancient Abana. It is connected by rail with Beirut, and has often enjoyed temporary importance on account of its position as a natural route from Mesopotamia to the coast. It is also on the pilgrim route southward to Mecca, which is now followed by the railway as far as Medina (see p. 139).

THE PLAIN OF MESOPOTAMIA.

The word '**Mesopotamia**' means 'between the rivers'—*i.e.*, the Tigris and Euphrates; but the plain is now considered to include all the land between the Armenian mountains on the north, the ranges which border the plateau of Persia on the east, and the wall of cliffs which flanks the desert plateau on the west. The northern portion of this area, which corresponds roughly with the ancient kingdom of Assyria, has a more diversified surface than the southern, which was occupied by Chaldæa and Babylonia. The southern is composed mainly of clay, and the land is so low and flat that fever swamps are found wherever drainage canals are lacking. The river delta is a vast morass.

Climate and Productions.—The climate is so dry that cultivation depends entirely on irrigation, but where this is available the yield is good. In former times much of the area was devoted to agriculture,

SOUTH-WESTERN ASIA: CLASSICAL

but the Turks have allowed the old irrigation works to decay, so that most of the district consists of hard-baked clay, affording scanty pasturage in places for the flocks of the nomadic Kurds and Arabs. Close to the rivers, where annual floods allow of easy irrigation, maize, wheat, tobacco, and cotton are cultivated, and date-groves are numerous between Baghdad and Basra.

Mosul stands at the head of navigation on the Tigris. It is a natural centre for routes from Persia, the Black Sea, and Mediterranean, and a bridge, partly built of stone, partly composed of boats, crosses the Tigris at this point. Close to it, but on the opposite bank, is the site of the ancient city of Nineveh, now in ruins.

Baghdad was built in the eighth century on the Tigris, where that river approaches so near the Euphrates that they may be united by canals suited for irrigation as well as navigation. In the ninth century Baghdad became one of the chief cities of the Mohammedan Arabs, called Saracens, and a great centre of trade under Harun-al-Rashid—the Caliph rendered immortal by the 'Arabian Nights.' It derives considerable advantage from the fact that a tributary which enters the Tigris near this spot defines a valley-route leading across the Zagros Mountains to Persia. River steamers can also ascend the Tigris to this point. The city has gradually dwindled since the irrigation works were neglected, but still extends to both banks of the river, which are connected by a bridge of boats. In appearance it resembles many other Mohammedan cities, with its flat-roofed houses built of yellow brick, its mosques and minarets, its bazaars or open shops, and its cosmopolitan population.

A little south of Baghdad, and on both banks of the Euphrates, once stood the famous city of Babylon, of which only the ruins now remain. Like Baghdad, it possessed this advantage—that water for irrigation could be led by canals from both rivers. When Nebuchadnezzar rebuilt it and made it his capital, he had the Euphrates bridged at this point. **Basra** lies in a marshy, malarious district, but is the natural port of the region ; and ocean vessels can ascend the Shat-el-Arab —*i.e.*, the united Tigris and Euphrates—to this point. The Euphrates is of little use for navigation, mainly on account of artificial obstructions ; and, though some trade is carried on by the Tigris, traffic is at present mainly dependent on caravans.

ARABIA.

Arabia falls into the following natural regions: (1) A series of coastal belts; (2) the deserts of the tableland; (3) the higher and more diversified central highlands called Nejd. The coastal belts along the Red Sea and north part of the Persian Gulf belong politically to Turkey; while the peninsula of Sinai forms part of Egypt, and is thus under English control, though acknowledging Turkish suzerainty. The rest of the country, save the British Protectorate of Aden, is governed by various Arab chiefs.

The **climate** of Arabia is hot and nearly everywhere dry.

THE COASTAL REGIONS.

The Western Coastal Belt.—The greater portion of this is excessively sterile, and the sandy shore is backed by rocky ranges. Off the coast lie numerous coral reefs, which render navigation dangerous; and the one port of the region—**Jedda**—owes its existence to its proximity to **Mecca,** the birthplace of Mohammed, which is yearly visited by numbers of his followers. **Medina,** which lies amid date-palms in an oasis rather farther north, and contains Mohammed's tomb, is also much frequented by pilgrims. The province of **Yemen** in the south is more mountainous, and thus the higher slopes receive in autumn a fair rainfall, which is carefully utilized for irrigation. The hills here have been terraced to a great height; and coffee and vegetables and such fruits as grapes, figs, peaches, and pears, besides dates, are produced.

Coffee thrives well, as it requires to be grown on hill-slopes where drainage is possible, and needs a damp, warm atmosphere. The shrubs grow to about 15 to 18 feet high, flower in March, and yield three crops of berries in the year. Six years are generally required before the shrub comes into full bearing, but it then continues to bear for thirty or forty years. The tree produces dark red berries, and inside each berry is a husk containing two beans.

The Southern Coastal Belt.—Most of this is a desolate region, backed by barren mountains; and cultivation is restricted to a few watercourses. From of old the region has been noted for frankincense, myrrh, and gum—all resins from different kinds of trees. The town of **Aden,** situated in the British Protectorate of that name, which is under the government of the presidency of Bombay, stands on a bare rock, part of the crater of an extinct volcano. It suffers from an unhealthy, sultry climate, and rain only falls at intervals of a year or two, when it is stored

in huge rock-hewn reservoirs. Water is also carried into the town as well as being obtained by condensation of steam from salt water. On account of its position and good natural harbour, the town has become an important fortified coaling station, and, being a free port, has also a large entrepôt trade. Politically attached to Aden are the fortified isle of Perim, in the Straits of Bab-el-Mandeb, the Kuria Muria Isles, and Sokotra. The last exports aloes (from which a drug is manufactured), dates, and gum.

The Eastern Coastal Belt.—The mountainous area of **Oman,** like Yemen, receives a fair rainfall in autumn, so that it is partly clad with forests, and the lower slopes are cultivated. North of Oman the coastal belt is unproductive ; but in the Persian Gulf are the **Bahrein Isles,** whose inhabitants are engaged in pearl-fishing. These isles are under British protection.

THE ARABIAN DESERTS.

The whole of the interior of Arabia suffers from drought, and also from great changes of temperature. Frost is not unknown at night ; while by day the absence of vegetation increases the absorption of heat by the ground, and consequently the amount of heat radiated from it. These changes of temperature affect the rocks, for with cold they contract and with heat expand, and the result is a tendency to crack and disintegrate. Any pieces of rock thus split off are blown along by the wind, and not only carve, scratch, and polish the rocks with which they come in contact, but are themselves in time reduced to sand.

Scenery.—In some places this process has gone further than in others, and thus, while the desert in the northern part of Arabia consists largely of gravel and flint, that farther south is of sand. Even the sand-deserts vary, not only in colour, but in surface, according as the action of the wind forms sand-dunes or scoops out hollows. North of Nejd the sand over a large tract is of a brilliant red hue ; but in some other parts it is yellow or white. There are no permanent streams on the tableland, and only a few wadis, or channels, occasionally supplied with water after rain, but never with enough to reach the sea. There are, however, springs which create oases, where date-palms, cereals, and pulses can be cultivated ; and water can be obtained in many places by sinking wells. Even in the most arid regions some thorny plants will thrive ; and most parts, after a slight fall of rain, are covered with grass.

Population.—On this vegetation the wild ostrich and gazelle exist; and the Arabs, though forced to live a nomadic life, are able to rear flocks of camels, horses, sheep, and goats. These Arabs, who are often called **Beduins,** are excellent horsemen, and possess little save their flocks, tents, cotton clothes, and characteristic long spears. The privations of their life have tempted some tribes to become the raiders of the caravans and of the more settled population in the oases.

These **caravans** are simply companies of traders or pilgrims, who, for purposes of safety, cross the desert together under the guidance of men who know the tracks along which water can be found at sufficiently frequent intervals. The camel is invariably employed for long desert journeys, as it is able to subsist on the prickly desert shrubs, and to live, even in summer, for five or six days without water. A camel can carry a load of 350 to 450 pounds, and its pace is about five or six miles an hour; but a large caravan rarely averages more than half this rate.

One of the dangers in crossing the sandy deserts is the possible occurrence of the **Simoom.** This is a storm caused, like a cyclone, by a current of hot air, which, rising, creates a draught, and thus sets up an inward, circular swirl of air. This raises the sand, and the air becomes so stifling that animals and men are sometimes suffocated thereby. A common phenomenon in the desert is the **mirage,** an optical illusion produced by quivering refracted light over the heated surface, whereby travellers imagine they see water, trees, or other objects, which do not exist where they appear to be.

NEJD.

This is the central highland region, where the rainfall is sufficient to convert some of the upper tracts into good pastures, so that it has long been noted for its camels, horses, and white asses. In the valleys are many scattered, cultivated oases producing dates and millet, and supporting a fair population. The inhabitants live in walled villages composed of houses built of sun-dried bricks, or huts of mud, and are very poor. Their very existence is sometimes threatened by prolonged drought, pests of locusts, or the blackmailing of the desert tribes.

The Trade of Arabia is largely dependent on the pilgrims; but the value of the total trade is small for so large an area. **The chief exports** in order of value are: (1) Camels, sheep, hair, and wool; (2) copper; (3) dates; and (4) horses.

THE PLATEAUS OF CENTRAL ASIA.

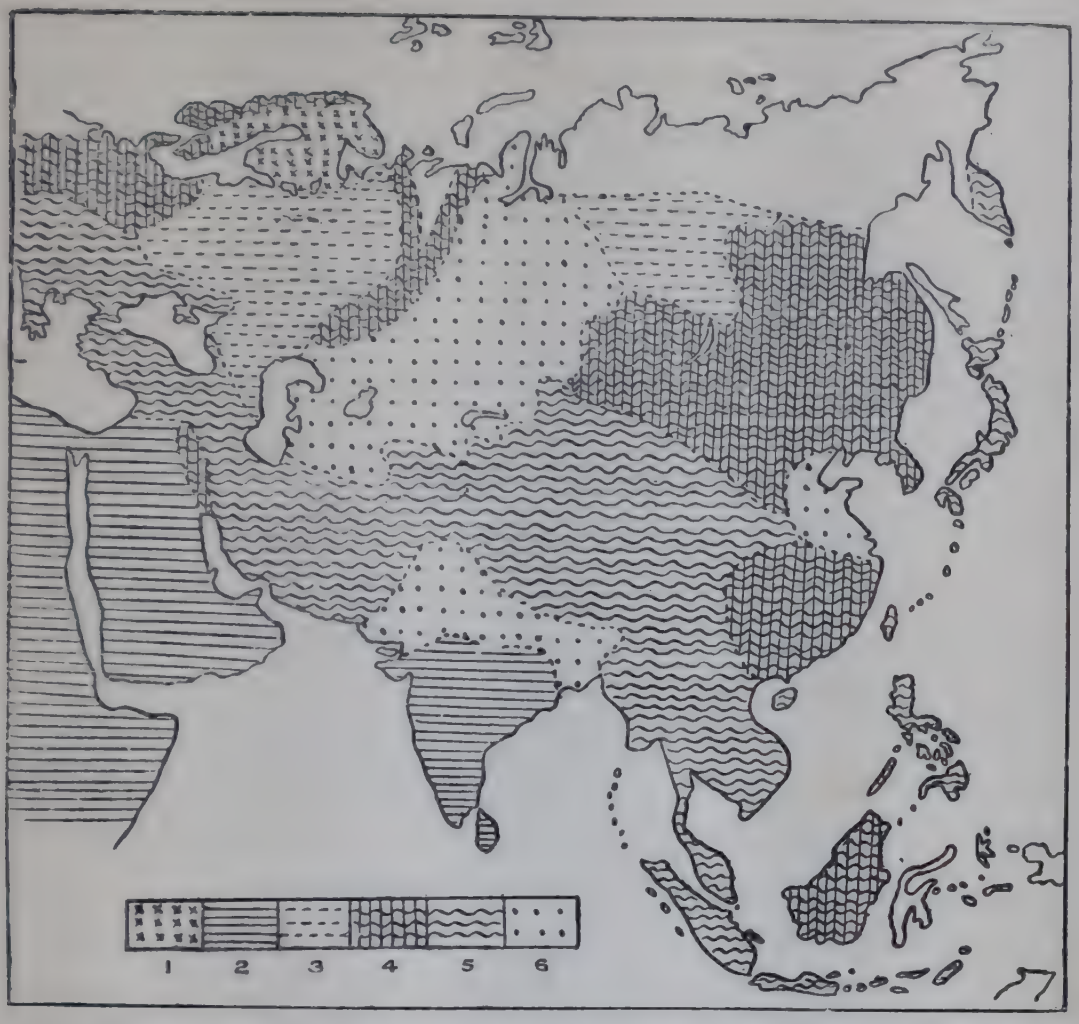
Relief.—Across the middle of Asia there stretches a belt of plateaus flanked by high ranges. The centre of this system seems to be the **Pamirs,** which are a series of lofty and broad valleys separated and bounded by snow-clad mountains. The Pamirs stand at the meeting-place of the dominions of Russia, China, India, and Afghanistan. From them radiate the following ranges and plateaus: (1) The Tian Shan, which forms the northern boundary of the plateau of Eastern Turkistan; (2) the Kuenlun, which bounds the same on the south and the far higher plateau of Tibet on the north; (3) the Karakorum, which crosses the plateau of Tibet in the west; (4) the Himalayas, which form the southern boundary of the same; (5) the Hindu Kush, which forms part of the northern boundary of the plateau of Iran; (6) the Hala and Sulaiman Ranges, which form the eastern boundary of the same.

Farther west the ranges converge towards the plateau of Armenia, which is the meeting-point of the Pontic and Taurus Ranges, enclosing the plateaus of Asia on the east, and the Elburz and Zagros Mountains enclosing the plateau of Iran on the west. In North-Eastern Asia lies the plateau of Mongolia, flanked on the north by the Altai Mountains, and the highlands around Lake Baikal, and on the east by the Khingan Mountains. All the above-mentioned ranges are due to the folding of the earth's crust long ago, like the ranges that cross Southern Europe.

Climate.—Throughout this region the range of temperature is very great, and the winters are extremely cold on account of the altitude. The region suffers from lack of rain, for in winter it is an area of high pressure, from which winds tend to blow outwards, and having passed over land are dry, and in summer the surrounding ranges prevent moisture-laden winds from the sea from penetrating so far (see Maps on pp. 136 and 137). The lack of rain and position of the ranges render it difficult for such small rivers as exist to reach the sea, and the greater part of the region is therefore an area of inland drainage (see p. 183).

THE PLATEAU OF IRAN, PERSIA.

This plateau is shut in by the Caspian Sea, the plain of Turan, the plain of the Indus, the Arabian Sea, the Persian Gulf, and the plain of Mesopotamia. From all these the interior of the plateau is separated by a mountainous girdle, which is so broad on the west as to occupy half of Persia. The area falls, therefore, into the



(1) Areas composed of ancient Archæan rocks. (2) High plains composed of unfolded sedimentary rocks. (3) Lowlands composed of unfolded sedimentary rocks. (4) Highlands and Lowlands mainly composed of rocks folded in ancient geological periods. (5) Plateaus and ranges mainly composed of rocks folded in recent geological epochs. (6) Plains mainly composed of unfolded recent deposits.

N.B.—The structure of areas left blank is unknown.

ASIA: STRUCTURAL DIVISIONS. (After Herbertson.)

following natural regions: (1) The western highlands; (2) the northern and eastern ranges; (3) the interior plateau. To these may be added (4) the narrow coastal strips along the Persian Gulf and Arabian Sea. Politically the area is divided between Persia, Afghanistan, and Baluchistan.

THE COASTAL STRIPS.

The Persian Gulf Seaboard.—This suffers from a dry, hot, unhealthy climate, and the soil produces only a few date-palms, save in the fertile strip round the head of the Persian Gulf. The chief Persian port is **Bushire,** which stands on a sandy ridge cut off by a saline swamp from the mainland. The harbour is little more than a roadstead, accessible for sea-going vessels of moderate size, and the town is very

unhealthy. Like all Persian ports, it is at a disadvantage, owing to difficulties in communicating with the plateau. The little island of **Omruz,** at the entrance to the Persian Gulf, was formerly a great depot for Eastern trade, but is now nearly deserted. Some pearl-fishing is carried on in the Gulf.

The Southern Seaboard from the Straits of Ormuz to the mouth of the Indus has a singularly regular coast-line, and is backed by parallel ranges which rise steeply to the plateau.

THE WESTERN HIGHLANDS.

These are composed of many ranges, all running from north-west to south-east, and grouped in two parallel belts, with a broad, elevated valley between. The eastern ranges cease east of a line drawn through Teheran and Kerman, and beyond this lie the deserts of the plateau. The western ranges are known in the north as the **Zagros Mountains,** and farther south flank the coast of the Persian Gulf. The prevailing rock is porous limestone, which engulfs many of the rivers, and is the cause in places of a subterranean system of drainage.

Productions.—All cultivation depends on irrigation; for the rainfall is scanty, and, as in the Mediterranean region, falls mainly in winter. Forests are limited to the moister western slopes, and elsewhere trees are rare, save for the orchards of olives, oranges, apricots, etc., that surround the towns and villages. The vine and mulberry are also cultivated, and wheat, barley, tobacco, and opium grown on irrigated areas. Here and there rich pastures occur, and Persia is noted for its horses, and the wool and hair of its camels, sheep, lambs, and goats. The prevailing scenery is, however, that of a poor steppe-land; and the sharp contrast between this and the luxuriant vegetation of the few well-watered districts largely explains the high place accorded by poets to the charms of the latter.

Towns.—Most of the population of Persia lies in this western region. **Teheran**—the capital—stands near the foot of Mount Demavend, with the drawback of an unhealthy climate, especially in summer. From it routes diverge to all the chief towns in the country: (1) North-westward to **Tabriz,** which stands on the road to Trebizond. (2) Southward to **Ispahan** and **Shiraz,** both centres of trade in fertile districts. Shiraz has long been noted for its rose-gardens and wine. (3) South-westward to **Kerman,** where shawls and carpets are manufactured.

(4) Eastward to the sacred city of Meshed. All these routes are suited merely for caravans, and often are in bad repair. No railway exists in Persia, save one a few miles in length near Teheran.

THE NORTHERN AND EASTERN RANGES.

The **Northern Ranges** consist of the Elburz Mountains, the Khorassan Mountains, and the Hindu Kush. The **Elburz Range** culminates in the beautiful peak of **Mount Demavend.** This is a quiescent volcano, but sulphurous fumes are still exhaled from the crater, and the cone is formed largely of rock-sulphur. The northern slopes of the range descend steeply to the Caspian, and are clad with forests.

The **Khorassan Mountains** are chiefly devoted to pasturage, and shawls and carpets from the wool thus produced are manufactured at **Meshed.** This is a holy city in Persia, containing the tomb of a noted saint, which is yearly visited by numerous pilgrims. It stands near the end of a river, which, after creating a broad, fertile valley among the mountains of North-West Afghanistan, gradually dwindles away. The fertility of this valley, which is noted for its wheat, grapes, and horses, has tempted frequent invasion, especially as the chief town in it—**Herat** in Afghanistan—lies at a natural focus of routes from Meshed, Kandahar, and Merv, and not far from the railway running to the last. The place is therefore strongly fortified. It manufactures silk goods and carpets. **Kabul,** the capital of Afghanistan, stands on the Kabul tributary of the Indus. A route follows the Kabul Valley, and then goes through the **Khaibar Pass** to Peshawar.

The **Eastern Ranges** consist of the Sulaiman and the Hala Mountains, which run south of the Khaibar Pass to the coast. Between them is a valley which, with the **Bolan Pass,** forms a route from India to Quetta, and is now followed by a railway. **Quetta** lies in the British province of Baluchistan, and is a highly fortified military station.

THE HEART OF THE PLATEAU.

This is everywhere arid, but its surface is diversified by depressions, of which the two largest and most northern are the Great Salt Desert and the Seistan lowland. The **Salt Desert** is composed partly of sandy soil strongly impregnated with salt, partly of blocks of solid salt, and partly of swamps. The region is practically uninhabited.

The **Seistan depression** is traversed by rivers, which terminate in shallow pools and reedy marshes. The soil is sandy, but, with irrigation, cultivation is possible, and cereals and fruits are grown to perfection around **Kandahar** in Afghanistan. This town is chiefly important from its central position between Herat, Kabul, and Quetta.

Trade.—Throughout the plateau of Iran transport depends mainly on camel caravans, and the volume of trade is relatively small. **The chief exports** of Persia in order of value are: Fruits, fish, opium, carpets, silk and silk cocoons, rice, hides, raw wool and woollens, and raw cotton and cottons.

THE PLATEAU OF TIBET.

This lofty plateau lies between the Kuenlun and the Himalayas, which converge towards the Pamirs on the west. On the east the plateau broadens out, and is flanked by many ranges, which, turning southward, separate the gorges of the upper Hwang-ho, Yangtse, Mekong, and Salwin. Besides these rivers, which rise on the plateau, there are the Indus and Sanpo—the upper course of the Brahmaputra—which have their sources close together, but flow in opposite directions, and finally break through the Himalayas—the one at the western and the other at the eastern extremity in unnavigable gorges.

Tibet falls roughly into two natural regions, the larger consisting of the northern plateau, and the other composed of the valleys in the south. The country forms part of the Chinese Empire.

The Northern Plateau.—This is traversed by a few chains of rounded hills, which separate broad valleys occupied by numerous lakes and wadis. It is at best a poor pasture-land, but has a rich native fauna, including antelopes, yaks, wild sheep, bears, wolves, jackals, etc. The musk deer, from which the valuable musk scent is obtained, is also found here as well as on the Himalayas. Most of the region is uninhabited, but towards the south there are nomadic Tibetans, who tend herds of yaks, ponies, sheep and goats.

The **yak** here takes the place that the reindeer fills in the Tundra region; for it has similar powers of enduring cold and subsisting on scant vegetation, while it supplies the natives with milk, flesh, and hair, which is woven to form the black material used for tent-coverings. The animal is also very sure-footed, and therefore especially suited to serve as a beast of burden across the mountains encircling the plateau, though ponies, sheep, and even goats, also are used for this purpose. Most of the inhabitants are clad in long sheep-skin coats, and subsist on oatmeal porridge,

mutton, butter, and tea. A few find employment in obtaining salt from the shores of the lakes, and borax, which is used among other purposes in manufacturing enamel, glazes for pottery, and some sorts of glass.

The Southern Valleys.—These, on account of their depth, and hence relative warmth, are the most fertile part of the country, and oats, pulses, and even fruit-trees, are cultivated. The bulk of the population of Tibet is concentrated in the valleys of the Sanpo and its tributaries. Some of the natives are engaged in agriculture, some in metal-work and weaving; but a large proportion are lamas—*i.e.*, priests of the Buddhist faith, which is the predominant religion in the country.

Buddhism is founded on the philosophical and religious teaching of a man called Buddha, who dwelt in the plain of the Ganges in the fifth century. In the main, this religion has degenerated in Tibet into what is, practically, the worship of relics or images of Buddha, and the mechanical performance of many rites and ceremonies. The lamas lead a celibate life, dwelling in monasteries, and supported by the rest of the population, though some also earn money by trading. The chief lama dwells in a magnificent palace on the summit of a hill a short distance from Lhasa, amid a number of monasteries.

Lhasa itself, the capital of Tibet, lies on the north side of the valley of a small tributary of the Sanpo. It is the natural focus of the trade of the country, importing brick-tea and cotton goods from China, animals and animal products from Mongolia, and silks, rice, indigo, sugar, and spice from India. All transport is by pack-animals or human porterage. **The chief exports** in order of value are—silver, gold, salt, wool, woollen manufactures, furs, drugs, and musk.

THE PLATEAU OF EASTERN TURKISTAN.

This is another of the Chinese dependencies, and lies between the Tian Shan Mountains on the north, the Kuenlun on the south, and the Pamirs on the west. Though of considerable altitude, the area is only half as high as the plateau of Tibet, and forms the basin of the **Tarim.** The banks of this river are fringed with poplars, willows, and tamarisks, and the saline swamps of Lob Nor, in which it terminates, are covered with reeds, which form the home of many water-fowl and wild animals.

The region has a continental climate, and is very deficient in rain; the tributaries of the Tarim deriving their waters from the snows and

glaciers of the encircling mountains. When these rivers descend to the plateau, their waters are used for irrigation ; so a series of green oases marks the northern base of the Kuenlun and the southern of the Tian Shan, contrasting sharply with the expanse of brown, shifting dust and sand elsewhere, and defining the two great trade routes of the country. These meet at **Kashgar,** a walled town that has become an important trading centre, which stands in the midst of a rich oasis, and commands routes by passes across the Pamirs to Western Turkistan.

Another important place on an oasis on the southern route is **Yarkand,** a great market for live-stock and wool. The western Kuenlun are rich in gold, and south of Yarkand in an ornamental stone called **jade.**

THE PLATEAU OF MONGOLIA.

This falls into two natural regions : (1) The Desert of Gobi, which occupies most of Mongolia, and extends into Eastern Turkistan ; (2) the low plateau of Dzungaria. Mongolia has recently declared its independence of the Chinese Empire, but the declaration has not been officially recognised.

The Desert of Gobi.—This is a high, arid region ; but, though much of it is a sandy waste in the west, and gravel or barren rock in the east, there are grassy tracts where large flocks of camels, horses, and sheep are reared. It forms a great natural obstacle to trade between China and Siberia, but is crossed by a few regular caravan routes. One of these leads from Peking to Urga for Kiakhta and Irkutsk, and others to Dzungaria. Dzungaria occupies the gap between the Tian Shan and Altai Mountains, and is important on account of the routes that pass through it to Western Siberia. The inhabitants of Mongolia are engaged chiefly in stock-rearing or in caravan traffic, and hence nearly all are nomadic.

THE MONSOON COUNTRIES.

Climate.—The whole of South-Eastern Asia, embracing Manchuria, China, Korea, Indo-China, India, and the islands fringing the eastern coast, has a climate which is everywhere influenced by the seasonal winds called 'monsoons.' The countries receive the bulk of their rainfall in summer, for the winds blow then from the ocean and evaporate much moisture in crossing the warm seas. In winter the

prevalent winds blow from the land, and are relatively cold and dry. The change in the winds is due to alteration in the position of belts of high and low pressure, caused by the shifting northwards of the belt of greatest heat in our summer, and to the fact that land changes its temperature more rapidly than water (see pp. 321 and 323). The fertility of the monsoon countries is largely due to the occurrence of heat and moisture together, while the bracing winter renders them healthy. Hence they are on the whole densely populated (see p. 187).

MANCHURIA.

Climate and Productions.—This country still belongs to China, but with impaired Chinese authority. Part of it is a plain, but though it is far warmer than the plateaus of the interior and very fertile, it, too, suffers an extreme range of temperature, and has a rather slight rainfall, as it is partly cut off from sea winds by ranges. Good crops of millet, wheat, beans, hemp, and ginseng are grown, the last being cultivated for the sake of a drug obtained from the root. Some gold is mined, and the eastern ranges are clad with forests, which form the home of numerous wild animals, including the tiger, lynx, leopard, bear, sable, etc. The skins of some of these are of high commercial value.

Towns.—The plain is crossed from north-west to south-east by the Siberian Railway to Vladivostok via Kharbin. From Kharbin a branch runs southward through **Mukden**—the capital of the country—to **Port Arthur,** a great naval station, which was captured by the Japanese from the Russians in 1905, and is now leased by them from China. The line to Port Arthur is connected with Niuchwang, and continued south-westward to Peking. **Niuchwang** is a treaty port—*i.e.*, a port which, by treaty, has been declared open to foreign trade—but is obliged to utilize an outport on account of its diminishing depth, and, moreover, is frozen in winter.

CHINA.

This is a very compact mass of land of roughly circular shape, which protrudes into the Pacific on the east, and ascends on the north and west to the plateaus of Mongolia and Tibet. On the south and east it is, to a large extent, cut off from other countries by a series of ranges and deep gorges; but the exposed nature of the northern frontier led to the construction of the **Great Wall** about 200 B.C. This wall runs from

Peking about 1,600 miles westwards, but only coincides with the political frontier after crossing the Hwang-ho. Near Peking it is built of massive blocks of granite, and varies from 25 to 40 feet in height. It is wide enough at the top for a carriage-road, and is flanked by towers at frequent intervals. Further west, however, it sinks to a mere mud rampart, and in places has fallen completely into ruins.

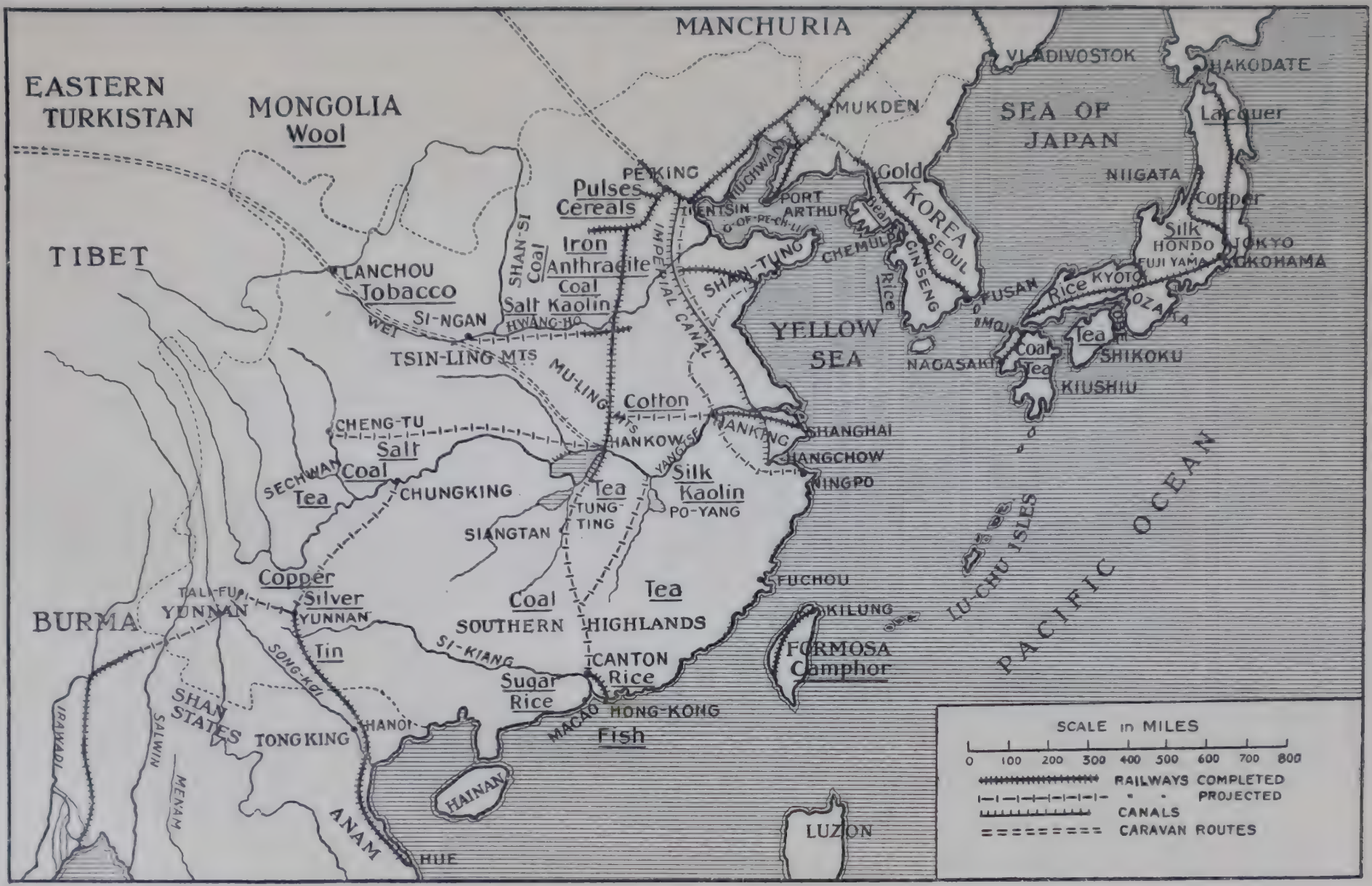
Climate.—China experiences dry, cold northerly winds in winter, and is very cold in the north. The summers are hot, especially in the south, and rain is brought at that season by the south-east monsoon. The range of temperature is fairly great in most parts.

From a consideration of the relief of the country, China falls into the following areas: (1) The Northern Highlands; (2) the Great Plain, which extends south to Hangchow Bay; (3) the Western Highlands; (4) the Basin of Sechwan; (5) the Plain of the Middle Yangtse; (6) the Southern Highlands; (7) the Valley of the Si-kiang and south-east coastal plain. Of these regions numbers (1) and (2) are crossed by the Hwang-ho, and (3), (4), (5), and (2) by the Yangtse.

NORTHERN CHINA.

The **Hwang-ho** rises in Tibet, and has a general eastward trend, save for the noticeable northern bend in its middle course, which defines three sides of a square, the fourth being supplied by its tributary the Wei. The river is swift, broad, shallow, and obstructed by many shoals throughout the greater part of its course, while where it forms the western boundary of Shansi it passes through a narrow rocky gorge. Its name, which means Yellow River, is due to the colour imparted to it by the yellow loess soil over which it flows, and which forms the sediment brought down. This sediment so raises the bed of the river in its lower course that the floods to which it is subject would inundate vast regions were it not for artificial embankment. As it is, the river has caused so much damage as to be called 'China's Sorrow,' and has frequently altered its lower course, so as sometimes to flow into the Gulf of Pechili, and sometimes into the Yellow Sea.

The **Northern Highlands** lie north of the Tsin-ling Range which is practically a continuation of the Kuenlun. In spite of the somewhat bleak climate of these highlands, a fairly dense population is able to support itself by cultivating the fertile **loess** soil. This yellowish-brown deposit has been carried by wind and water in the course of centuries from the interior of Asia, and has not only covered much of the Great Plain, but the valleys and slopes of this north-western



THE FAR EAST: POLITICAL AND ECONOMIC.

area. In some cases it extends to a height of several thousand feet, and terraces have been constructed to prevent its being washed away by the rains. Owing to a tendency to vertical cleavage, it often forms steep precipices, and, being soft, is traversed by deep ravines carved out by watercourses. Even the roads are sunk, by the action of traffic, so far below the level of the surrounding country that caves are sometimes scooped out of the banks to form human habitations. Such a country is peculiarly difficult to traverse; while the advantages of fertility and ease of working possessed by the loess are somewhat counterbalanced by its porous nature, which renders irrigation necessary in most parts.

Productions.—The staple crops of the north are wheat, barley, millet, maize, pulses, and in some parts cotton and tobacco. Coal and iron are found in the southern province of Shansi, the coal-fields being of vast extent, and including both the hard anthracite and the soft bituminous coal. The measures occur, too, near the surface, so that mining is easy; but the difficulty of transporting the coal to the districts where it is most required has prevented a great development of mining up to the present. The chief route through the highlands follows the Wei Valley, passing the large town of **Singan,** and is continued westward into the Tarim basin, and north-westward to the Dzungarian Gap.

The Great Plain.—The coast is broken by the mountainous peninsula of Shantung, but is elsewhere low, sandy, and remarkably regular, the only important opening being the mouth of the Yangtse. Except for the mountains of Shantung, the surface is uniformly low, and the coastal belt south of that peninsula is studded with lakes. The soil is partly loess and partly alluvial silt brought down by the rivers. The most important of these rivers are the Yangtse, the Hwang-ho, and the Pei-ho. The last is navigable for small boats to a point opposite the site of Peking, and for coasting steamers to its port—**Tientsin**—save when it is frozen in winter. From Tientsin the **Imperial Canal** runs southward for 700 miles to Hangchow. This was made many centuries ago, and though the southern half is still much used, the northern has fallen out of repair in many places.

Productions.—Agriculture is everywhere the staple occupation, and is carried on with the minute personal care that we are only accustomed to bestow on gardens. On account of the porous nature of the soil irrigation is necessary in many parts. The crops are those mentioned above, and silk, which is especially important in Shantung. Large

numbers of fish are obtained from the sea, rivers, and lakes, and form an important article of diet throughout China. The plain is deficient in minerals, but coal is mined in Shantung and to the north-east of Tientsin.

Towns.—The plain is densely populated. **Peking,** the capital of the country, stands a little north of the Pei-ho, and is the focus of many routes. The town is composed of two portions—a square enclosure to the north, which is the Manchu city, and a rectangular area to the south, which is the Chinese city. Both are surrounded by high, massive walls pierced by gates which are surmounted by towers. Within the Manchu city are the Imperial palaces and many magnificent temples. Some of these temples are Buddhist, but some belong to the followers of **Confucius,** a philosopher who lived 550-478 B.C. These are the two prevailing religions observed in China.

Shanghai stands at the mouth of a small tributary, which enters the estuary of the Yangtse on its south side. It forms the port, not only of the basin of the Yangtse, but of much of the Great Plain, owing to the absence of other ports on the shores of the Yellow Sea. The harbour, however, is not deep enough for the largest ocean vessels, and the site is low and unhealthy. Its chief exports are silk, raw cotton, and tea, and there are silk and cotton manufactures in the town. It has also a large entrepôt trade. **Hangchow** manufactures a good deal of silk, as well as some cotton ; but its harbour is only accessible for quite small vessels, and it suffers from the strong tidal bores in the bay.

MIDDLE CHINA.

The **Yangtse** rises on the plateau of Tibet, and at first flows southward. Later it changes its course to an easterly direction, but this is varied by three marked bends towards the north. It is connected with the two large lakes of Tungting and Poyang and many small ones, which to some extent regulate its flow, although the volume of the river varies considerably with the season, and floods sometimes occur. The river forms a magnificent waterway, being navigable for large ocean vessels to Hankow, and for smaller sea-vessels to Ichang—nearly 1,000 miles from its mouth. Above Ichang the river passes through a gorge, and for the next 400 miles navigation is impeded by rapids. Many shallow boats are, however, annually hauled past them, and once or twice a small steamer has made the ascent successfully. The Yangtse has many large

tributaries, but those of most commercial importance are the Han, which is a fine navigable river, and the tributaries which cross the Sechwan basin and are useful for irrigation, as well as being navigable in their lower courses.

The Western Highlands.—These form a belt of parallel ranges and gorges which extend over Western Sechwan and Yunnan. The area is drained by the Upper Salwin and Mekong, as well as by the Yangtse. The mountains are clad with forests, and wheat, maize, and tobacco are produced in the lower areas. **Opium,** which is the dried juice obtained from the seed-vessel of a kind of poppy, was also widely produced here, but on account of its harmful nature the cultivation of the poppy is being rapidly suppressed in China. The province of Yunnan is very rich in iron, tin, gold, and precious stones, as well as in copper, which also occurs in South-West Sechwan.

The Basin of Sechwan.—This is an elevated region, though lower than the surrounding land. It lies almost entirely north of the Yangtse, and is crossed by a series of parallel tributaries separated by ridges, which render communication east and west somewhat difficult. The area is sometimes known as the Red Basin on account of its fertile red soil, which enables cultivation to be carried on even high up on the mountain slopes. The climate is hot and rainy in summer, and warm and misty in winter ; but irrigation is required for most crops, and especially for rice, which is generally grown under water. Other crops, besides the ordinary cereals and pulses, are tea, sugar, and mulberries for silk.

The **tea-shrub** grows best on hill-slopes which allow of good drainage, and prefers a light, rich soil with a good supply of vegetable mould. Though the plant can stand severe frost, it does best in a warm climate, and requires most moisture in summer. It takes three to five years for the shrub to come into full bearing ; and as there is a good deal of manual labour connected with picking the leaves at least three times a year, and their preparation for sale, it is only profitably grown where labour is cheap. Some processes in the preparation, as rolling the leaves, can be done by machinery, and this is gradually being introduced into the country. A good deal of inferior tea, composed of coarse leaves and twigs, after being sun-dried, is moistened with rice-water and compressed into the form of bricks. This brick-tea is largely manufactured in Sechwan for sale in Tibet, whither it is conveyed by yaks, mules, and porters (see p. 328).

The **sugar-cane** requires a rich soil, but demands little attention; for though the canes, which attain a height of 10 to 15 feet, have yearly to be cut to get the sugar, the roots continue to send up fresh shoots for about thirty years. As these shoots become less productive, however, in course of time, in many parts the canes are replanted every few years. After the canes are cut, and crushed to extract the juice, they are used as fuel; while the juice is boiled and treated so that part crystallizes as sugar and part flows away as molasses.

Besides agriculture, silk-weaving and straw-plaiting are important occupations; and mining is another, for the area is rich in coal, iron, and salt. Population is everywhere dense, and the capital of Sechwan—**Chengtu**—is fortunate in its position in the middle of an extraordinarily fertile region. The great drawback to trade is the difficulty in the way of communication, the best outlet being by the Yangtse through the river-port of **Chungking.**

The Plain of the Middle Yangtse.—This is a fertile, low, alluvial plain studded with lakes, and liable to be partly flooded whenever the melting of the snows on the western highlands or the summer rains cause the river to rise higher than usual. The chief products are cereals, silk, cotton, and tea, while cattle are reared in the north. Kaolin occurs east of Poyang, and has given rise to large porcelain works.

The **cotton-plant** is generally grown as an annual from seed, which is sown in the spring, and is seldom allowed to grow over 3 feet high. It requires a good deal of moisture and heat, though not an excess of either. During the autumn, the balls of fluffy cotton-wool which lie within the seed-vessels are picked; but before the raw cotton can be used it has to be separated from the seeds it envelops. Oil can be extracted from these seeds, and the refuse, pressed into cakes, forms good cattle fodder, or can be used as manure (see p. 330).

Hankow is the great trade centre of this plain, and is one of a group of three large towns at the confluence of the Han and the northern bend of the Yangtse. It thus benefits by water routes leading south-east, south-west, and north-west, and is accessible for ocean vessels. It is also on the railway to Peking, which it is projected to carry on to Canton, and is the centre of a fertile, densely populated area. Its chief trade is in tea and silk, and brick-tea is largely manufactured for export to Tibet and Siberia. The city suffered severely in the revolutionary war in 1911.

SOUTHERN CHINA.

The Southern Highlands.—These highlands were originally thickly clad with trees, but the trees are being rapidly cut down. Some forest products, however, are still important, as **camphor,** which is the hardened sap of a tree ; and **cinnamon,** which is the bark of the twigs of another ; while the inner bark of the mulberry-tree is used for making paper. Perhaps the most valuable vegetable product of the Monsoon region is the **bamboo,** which is used in the construction of innumerable articles. The leaves are also utilized for thatch and matting and the young shoots cooked for food.

The **Si-kiang** rises in the highlands of Yunnan, and has a fairly direct course eastward to its mouth, where it forms a large delta. The branch of the Si-kiang which passes to the north of this delta is known as the Canton River. The Si-kiang is somewhat impeded by rapids, but still forms a useful waterway. The Valley of the Si-kiang and coastal plain enjoy warm winters and hot, moist summers. Besides producing tea and silk, the region is well suited for rice * and sugar. Large quantities of fish are caught in the river and sea. There are several good ports, but by far the most noteworthy are Canton and Victoria on Hong-Kong.

Canton is situated so as to profit not only by the proximity of the Si-kiang, but by that of rivers from the north and east, which flow into the Canton estuary. It has thus become a great trade centre for the fertile area around, although its port is not deep enough for large ocean vessels. The Canton River is crowded with boats and rafts, and quite a large population resides thus afloat, and even such occupations as rearing poultry are pursued. Metal-work, stone-work, and other industries are carried on, but the place is mainly a great depot for collecting and exporting tea and silk.

Hong-Kong is an island at the mouth of the Si-kiang, which, with a peninsula on the mainland opposite, belong to the United Kingdom. The chief town—Victoria—has a magnificent harbour, and is a naval as well as commercial station. It carries on a large entrepôt trade with Britain, China, India, and Australia. The town of **Macao,** which also lies at the mouth of the Si-kiang, belongs to Portugal, but has an indifferent port. The large island of Hainan produces timber, but is unhealthy, and the coasts are subject to typhoons.

* For China's production of rice, see p. 328.

SEPTEMBER 16 '12

TRADE OF CHINA.

This is hampered by insufficient means of transport, though the difficulty is gradually being met by the construction of railways. At present, apart from the few railways that exist and the river and canal traffic, goods are either conveyed in small carts and wheelbarrows, or by baggage animals — mainly camels in the north — and by porters. The foreign trade is small in proportion to the size and resources of the country, and is carried on only through certain treaty ports, which are, however, numerous. **The chief exports** of China in order of value are silk, tea, beans, raw cotton, and straw braid.

KOREA.

This is a mountainous peninsula traversed by a range which lies nearer the east than the west coast. The rainfall occurs in summer, and is heavy on the eastern slopes of the mountains, which are densely clad with forests. The most fertile areas lie near the west coast, where rice, millet, beans, hemp, cotton, and ginseng, are cultivated. A good deal of gold is mined in the north. The capital of the country is **Seoul,** on a river which is navigable with difficulty to that point.

Korea was annexed by Japan in 1910, and many Japanese have settled there in recent times. **The chief exports** in order of value are pulses, ginseng, rice, and hides.

THE JAPANESE ISLES.

Relief.—The Japanese Isles separate the shallow seas—Okhotsk, Japan, and Yellow—from the deep waters of the Pacific, which are particularly deep east of the Kurile Isles and North Hondo. All the isles are mountainous and appear to be fragments of once continuous ranges. From Hokkaido (Yezo) one range can be traced passing through Sakhalin, and another through the Kurile Isles and Kamchatka. In North Hondo, ranges run north and south, while the configuration of South Hondo, Shikoku, and Kiushiu reflects the presence of two ranges running north-east to south-west, and separated by the Inland Sea. Farther south a range can be traced through the Luchu Isles and Formosa.

All these ranges are due to foldings of the earth's crust, though many of the mountains have been built up by volcanic action (see p. 151). From

the fact that they contain so many active volcanoes, and that the whole region is subject to earthquakes, we may infer that the district is still in an unstable condition, and subterranean movements still taking place. Sometimes the strata cannot resist the pressure of internal forces, and are broken across. In this case one side is generally lowered below or raised above the other, and such a displacement is called a fault. The formation of even a small fault would have the effect of jarring all the rocks in the vicinity ; and as rocks are slightly elastic, the waves of motion set up by the shock might be felt as an earthquake at a considerable distance.

Earthquakes are, in fact, only tremblings of the earth's crust, and, though they often accompany the formation of faults and volcanic activity, do not in themselves involve much actual disturbance in the surface of the land. The terrible loss of life they sometimes cause is mainly due to falling buildings or to the formation of great sea-waves, which overwhelm vessels and inundate low coastal regions. In Japan very slight earthquakes are of daily occurrence, and no year passes without some of a more serious type.

The **climate** exhibits the alternation of warm, rainy summers and cold winters, due to the monsoons ; and the temperature, though less continental in character than on the mainland, has a wider range than might be anticipated from the insular nature of the area. It is on the average colder than the latitude, judged by a European standard, would suggest.

The Kurile Isles and Hokkaido or Yezo.—On account of dangerous currents, prevalent fogs, and ice-drifts brought south in winter by the Arctic current, navigation is difficult along the coasts. Sea-fishing is, however, a staple industry, and salmon are caught in the short rivers and edible seaweed collected along the shores. The mountains are clad with forests, and Hokkaido is rich in coal and sulphur. Population is sparse. The majority of the inhabitants are Japanese, but on Hokkaido there still exists some remnant of a race called **Ainu,** who are thought to belong to the Caucasian group, and are remarkable for their hairy appearance. The chief town in Hokkaido is **Hakodate,** which has an excellent harbour.

Northern and Western Hondo.—Here, too, the climate is extreme, owing to the north-west winds of winter, which bring some snow and rain to the west coast ; while in summer this region is partly cut off

from the moderating influence of the monsoon by the mountains to the south-east. Communication with the mainland is hindered by the stormy nature of the Sea of Japan, and in winter is interrupted on account of the dangerous surf along the coast. The only western port—**Niigata**—has, moreover, a bad bar at the mouth of the harbour.

The mountains of Central Hondo greatly hinder communication between the east and west coasts of the island, though a few railways have been carried across. They also render the rivers too rapid, and their channels too choked with the boulders and silt brought down, to be of much use for navigation. Floods are of constant occurrence; but some of the rivers are of value as sources of water-power. The chief value of the mountains lies in the forests which clothe them, composed of cedars, pines, maples, bamboos, camphor and lacquer trees.

Occupations.—The lacquer-trees yield the **lacquer** used in the adornment of many Japanese wares; while the abundance of timber has led to the erection of paper-mills and match-factories. The match industry has naturally been encouraged by the local supplies of sulphur; and the occurrence of kaolin and of copper in Central Hondo has given rise to the manufacture of porcelain and metal goods. All the Japanese isles are deficient in domestic animals, on account of the limited amount of pasture-land, and agriculture is restricted chiefly to the valleys and narrow coastal plains. The soil, however, is fertile, and by dint of careful spade cultivation the yield is good. The chief productions of the north are wheat, barley, rice, beans, and mulberries grown for the silkworm.

South-Eastern Hondo, Shikoku, and Kiushiu.—These areas enjoy dry, cool winters and hot, wet summers. The shores are washed by the warm Kuro Siwo current, which raises the temperature of winds sweeping over it. The vegetation is luxuriant, and the beauty of the flowering trees, shrubs, and plants is proverbial. The lowlands are often devoted to rice in summer and wheat in winter, while the staple crop of the hill-slopes is tea. Silk is widely produced (see p. 332), and some cotton is grown, but not nearly enough to supply the cotton industry.

Towns.—The cotton industry is carried on chiefly at **Ozaka** and other towns in the fertile plain that borders the northern shore of the Inland Sea. Here the naturally dense population makes labour cheap, and affords a good market. As Ozaka has but a poor harbour, it is largely served by the port of **Kobe**. Coal occurs in north-west Kiushiu,

and can be easily shipped from the excellent harbour of **Nagasaki** and other ports. To the north of Ozaka lies **Kyoto,** the old capital of the country, where stand the palace of former Mikados and numerous Buddhist temples. All the towns along the coastal belt of the Inland Sea are connected by a railway, which runs northward to Tokyo and Yokohama. **Tokyo,** the capital of the country, is favourably situated in the middle of a small fertile plain, and carries on many artistic industries. It has, however, a small port, so most commerce passes through the fine harbour of **Yokohama.**

Formosa possesses a tropical climate and vegetation. A large part of the island is mountainous and covered with forests, which yield an important crop of camphor.

The chief exports from Japan, in order of value, are raw silk—of far the most importance—silk manufactures, cotton yarn and manufactures, copper, coal, and tea.

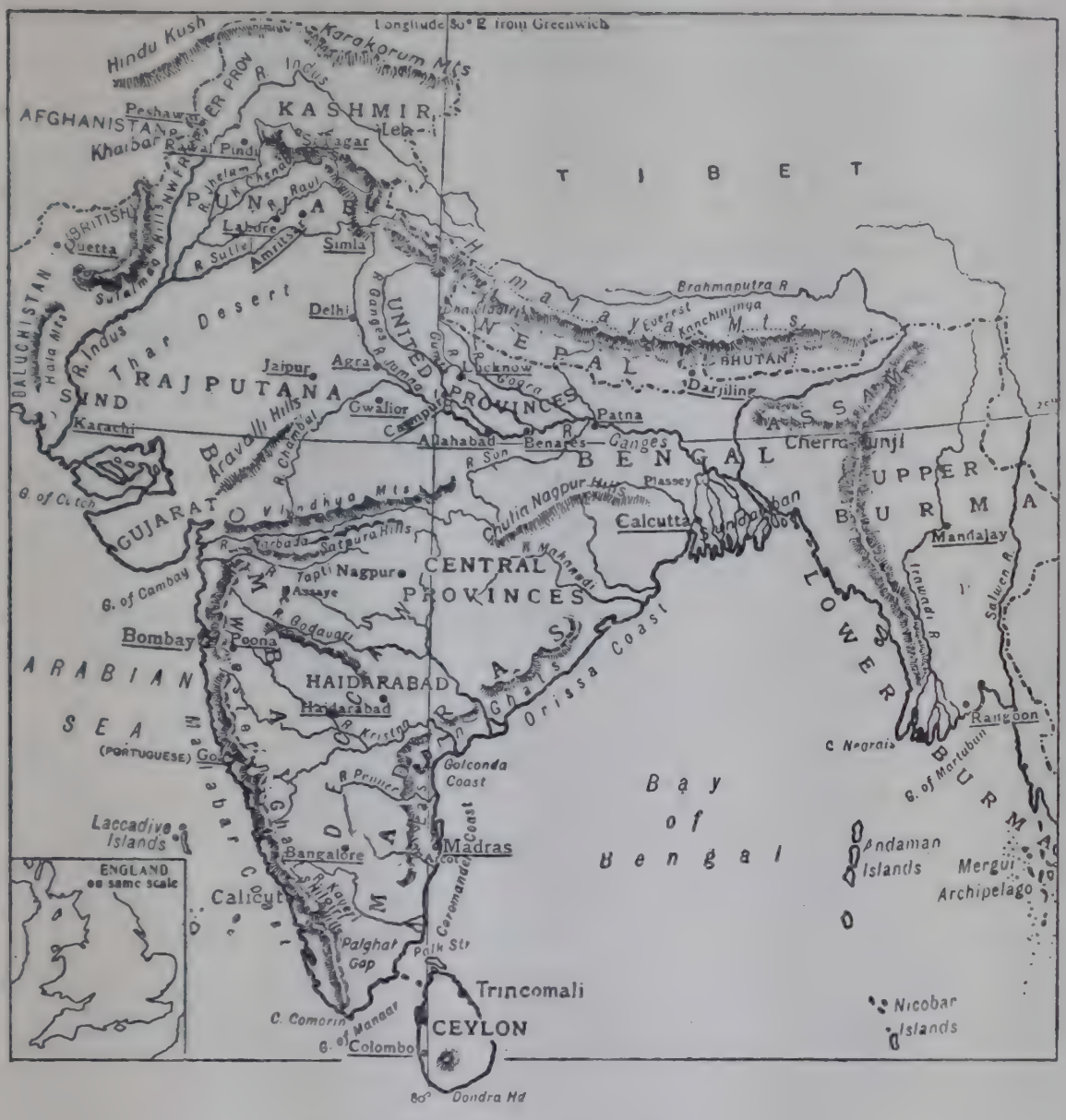
INDIA.

India, excluding Further India, falls into the following natural regions: (1) The northern ranges; (2) the northern plains; (3) the southern tableland; (4) the east coast plain.

Politically it is divided into—(1) certain British Province sunder the direct control of the British Crown, which is represented in India by a Governor-General, or Viceroy. The three chief provinces are Bengal, Bombay, and Madras. Some of the others are the United Provinces, the Punjab, the North-West Frontier Province, the Central Province, British Baluchistan, and Assam. Burma in Further India is another province of this type. (2) Certain Native States governed by Native Princes, who, however, have no power to make war with foreign or Indian States, and are expected in essential matters to follow the advice of a resident British official. The chief States are Kashmir, Haiderabad, Mysore, Baluchistan, Rajputana, and Central India, of which the two last comprise many minor States. (3) The independent States of Nepal and Bhutan.

THE NORTHERN RANGES.

The **chief ranges** which appear to radiate from the Pamirs in the north are—(1) The **Hindu Kush,** which is separated from the Sulaiman Range by the Kabul Valley. South of the Kabul Valley is the noted **Khaibar Pass**—a defile over thirty miles long, through which a road has been constructed; but the railway has not advanced much beyond the military station of **Peshawar,** which guards this route. (2) The **Sulaiman** Range, which lies between the Khaibar Pass



India : Physical and Political.

and the Bolan Pass. (3) The **Hala** Mountains, which extend as an unbroken wall nearly to the coast. (4) The **Karakorum** Range forms the northern boundary of the Upper Indus Valley, and can only be crossed by very difficult, high passes—the chief being the Karakorum Pass. This pass is over 18,000 feet high—*i.e.*, about $3\frac{1}{2}$ miles. (5) The **Himalayas** are a series of parallel ranges, extending for a distance of about 1,500 miles between the southward bends of the Indus and Brahmaputra Rivers. Their average height is over 3 miles, while some of the peaks are over 5. Mount Everest (29,000 feet) is considered the highest. The great width also of this mountainous belt has made traffic across it difficult. The chief routes lie across high passes

leading northward through Bhutan or from the health station of **Darjiling.** There is also a road which follows the Sutlej River, which breaks across the range and is overlooked by the hill-station of **Simla,** which is the seat of government for the hot part of the year. Goods are carried across by means of yaks, ponies, and even goats and sheep, while human porterage is employed to some extent.

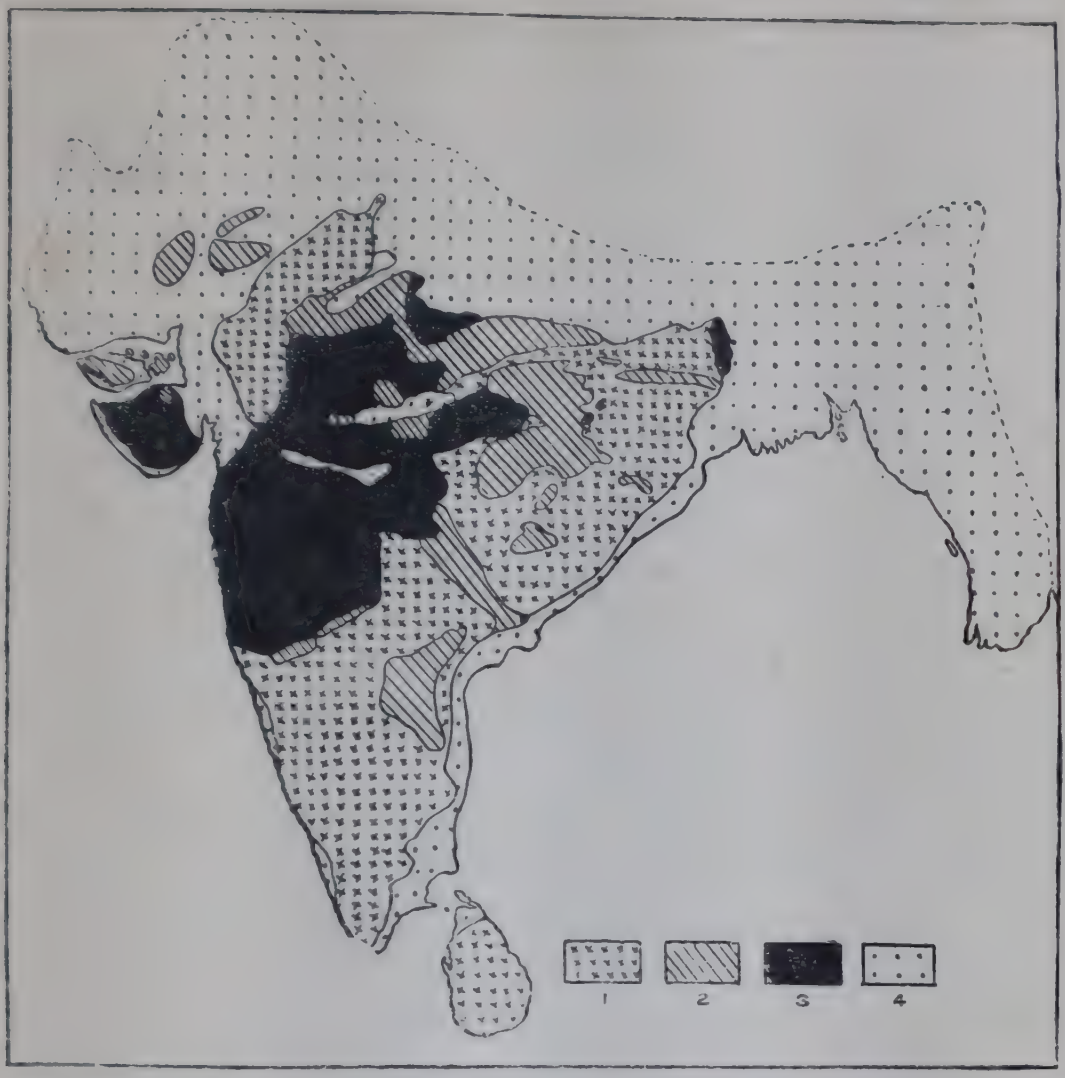
Climate and Productions.—The temperature varies with the altitude and aspect, the snow-line being at a height of about 16,000 or 17,000 feet on the southern slopes of the Himalayas, and lower on the northern. The snow-fields give rise to great glaciers, which form the source of mighty rivers. These rivers, in their upper courses, are wild torrents flowing at the bottom of deep, rocky gorges. Here and there in the valleys there is sufficient soil for cultivation, but elsewhere agriculture has to depend on the artificial terracing of the mountain-side. The chief crops are wheat, millet, pulses, and such fruit-trees as apricot, peach, walnut, and mulberry.

The rainfall is heaviest on the southern slopes of the Eastern Himalayas. The lower portions of these are densely clad with forests, the deodar and sal being important timber-trees. In front of the foot-hills lies the fever-breeding jungle called the **Terai**—the abode of many wild beasts. A little rubber is collected from the forests in Assam, and tea is cultivated in forest clearings on the mountain slopes in the same district, as well as near Darjiling and Simla (see p. 328). Between the forests and the snow-line are pastures on which cattle, sheep, and goats are reared in summer. The hair of the Tibet goat, reared in Kashmir, has long made that region noted for its shawls.

Population is sparse, and chiefly distributed in small villages of mud-built huts. Most of the hill tribes consist of men of small stature but of strong physique, and endowed with industry and courage. **Srinagar,** the capital of Kashmir, in the far-famed vale of that name, stands on the Jehlam, in the midst of a fertile area. The Jehlam, which is here crossed by a bridge, is suitable for boating for some distance.

THE NORTHERN PLAINS.

Climate.—The temperature is high, especially in late spring and summer, and the diurnal and seasonal range is great. In the 'cool season'—*i.e.*, from November to February—the climate is healthy and



1. Areas composed of archæan crystalline rocks. 2. Areas of sedimentary rocks. 3. Areas of basalt. 4. Lowlands, chiefly of alluvial formations.

INDIA: GEOLOGICAL.

pleasant. The winds are deflected from their natural directions by the trend of the Ganges Valley, which acts as a sort of flue. In winter, when the north-east trade-wind prevails over the peninsula and Indian Ocean, a north-west wind sweeps across the Punjab and brings it a slight rainfall. In summer, when the south-west monsoon prevails over the Deccan, a southerly moisture-laden wind crosses the Bay of Bengal, and turns as a south-east wind up the Ganges Valley (see pp. 136 and 137). This wind is cooled as it rises in front of the mountains of Assam and the Himalayas, and a copious rainfall results on the mountain slopes and over the Lower Ganges basin. As the wind travels westward, the rainfall diminishes, and is scanty in the Punjab. As the south-west monsoon does not blow strongly north of the peninsula of Gujarat, the Indus basin is deficient in rainfall, and irrigation is necessary for cultivation.

THE PLAIN OF THE INDUS.

The Indus.—This rises on the north of the Himalayas, and, after its mountainous career through Kashmir, turns abruptly south-westward and enters the Indian Ocean after a course of about 1,800 miles. Near its mouth the river divides into distributaries, which form intricate channels across its swampy, reed-covered delta. The Indus is navigable up to the gorges that extend to the confluence of the Kabul tributary; but, owing to the shifting sand-shoals in its bed, navigation is difficult and of very slight commercial importance. Of the five tributaries which give the name of **Punjab**—*i.e.*, land of five rivers—to the area they traverse, the most important are the Sutlej and the Jehlam, both of which are navigable for considerable distances, and the Chenab, which supplies water for large irrigation works. The surplus waters of the Indus, when it floods after the melting of the snows, are also run off into canals and used for irrigation.

Productions.—The chief crops grown in winter and reaped in spring in the Punjab are wheat, barley, and pulses—mainly chick-peas. Millet and indigo are grown during the summer and harvested in autumn. Salt is mined in the Salt Hills between the Jehlam and Indus. The grass-lands, which occupy large tracts in Northern Rajputana and Sind —*i.e.*, Northern Bombay—are used for rearing horses, cattle, and other live-stock, for which the saline properties of the soil make these districts very suitable. Bullocks or buffaloes are used everywhere in India as animals for draught, and there is therefore a great demand for them. These grass-lands fade into the **Desert of Thar.** The same desert conditions exist over **Cutch** and the Rann of that name, which in the dry season is a flat saline waste, and in the rainy season, when, moreover, the south-west wind blows the sea-water inland, a shallow sea. Salt is obtained here by evaporation.

Towns.—Population is dense in the Northern Punjab, and wherever there are means of constant irrigation. Elsewhere over the plain of the Indus it is scanty. **Lahore**, the capital of this province, is on the great route now followed by a railway from Peshawar to Delhi on the Jumna. Lahore is also connected with the Ganges by a railway, which, before turning south-eastwards, passes **Amritsar**—a town which manufactures shawls and is noted as the headquarters of the religious sect called **Sikhs.** Unlike the majority of the inhabitants of this area,

who are Mohammedans, the Sikhs have adopted a purified form of Hinduism. Many of the men have found employment as soldiers in the native army on account of their fine physique and bravery. A fourth railway from Lahore leads to **Karachi,** the natural port for the Punjab products, and which possesses an excellent harbour.

THE PLAIN OF THE GANGES.

The **Ganges** has a course of about 1,500 miles, and is navigable almost from the base of the Himalayas. Its chief tributary is the Jumna, and the district between these two rivers is intersected by canals supplied with water drawn from their upper courses. Some of these canals are used for navigation as well as irrigation. Many wells also have been sunk in the United Provinces for the sake of irrigation ; but the heavier rainfall of Bengal renders irrigation less necessary there.

Productions.—The chief winter crops of the United Provinces and Western Bengal are wheat, barley, maize, pulses, and flax grown for linseed-oil. The summer crops are sugar, indigo, rice, tobacco, and opium (see p. 175). A good deal of sugar is obtained from a species of palm as well as from the sugar-cane (see p. 328). **Patna** is a great collecting centre for rice and opium. Eastern Bengal is mainly devoted to growing rice and jute, the latter thriving on the sand-banks of the rivers, which are yearly flooded. **Jute** is an annual sown in spring and cut when about 11 feet high. The stems are then submerged in water for at least three weeks, after which the bark can be removed and the fibre separated by mashing and beating. The fibre is used for making sackcloth, and also in the manufacture of carpets and various textiles. It was formerly nearly all exported to Dundee, but now much is used in factories in and near Calcutta. The sacks are in great demand on account of the export of cereals from India.

The large delta created by the Ganges and Brahmaputra is a marshy region overgrown with forests of bamboo, coco-nut palms, plantains, and tropical creepers. Its name—**Sundarban**—in fact, means 'forest.' The delta is intersected by shifting distributaries in which crocodiles abound, while tigers and other wild animals frequent the jungles.

Towns.—The fertility of the Ganges basin has caused the whole to be thickly populated, but has also tempted invasion. Prior to the British conquest, the most noteworthy invasions in historic times were those of the Mohammedan Mongols, who founded the Mogul Empire in

the sixteenth century; and although the Hindus are now numerically predominant in this area, the Mohammedans still count as a very important factor in social and political life. Both **Delhi** and **Agra** were capitals of the Mogul Empire at different times; and to this fact are due the numerous mosques and mighty palaces and tombs which adorn them. The Indian Mutiny of 1857, which chiefly affected the towns of **Lucknow**—capital of the United Provinces—**Cawnpur** and Delhi, led to the final suppression of the Mogul Dynasty, and the transference of the government of India from the East India Company to the Crown. In 1911, on the occasion of the Durbar at Delhi celebrating the coronation of George V., that city was declared the capital of India instead of Calcutta.

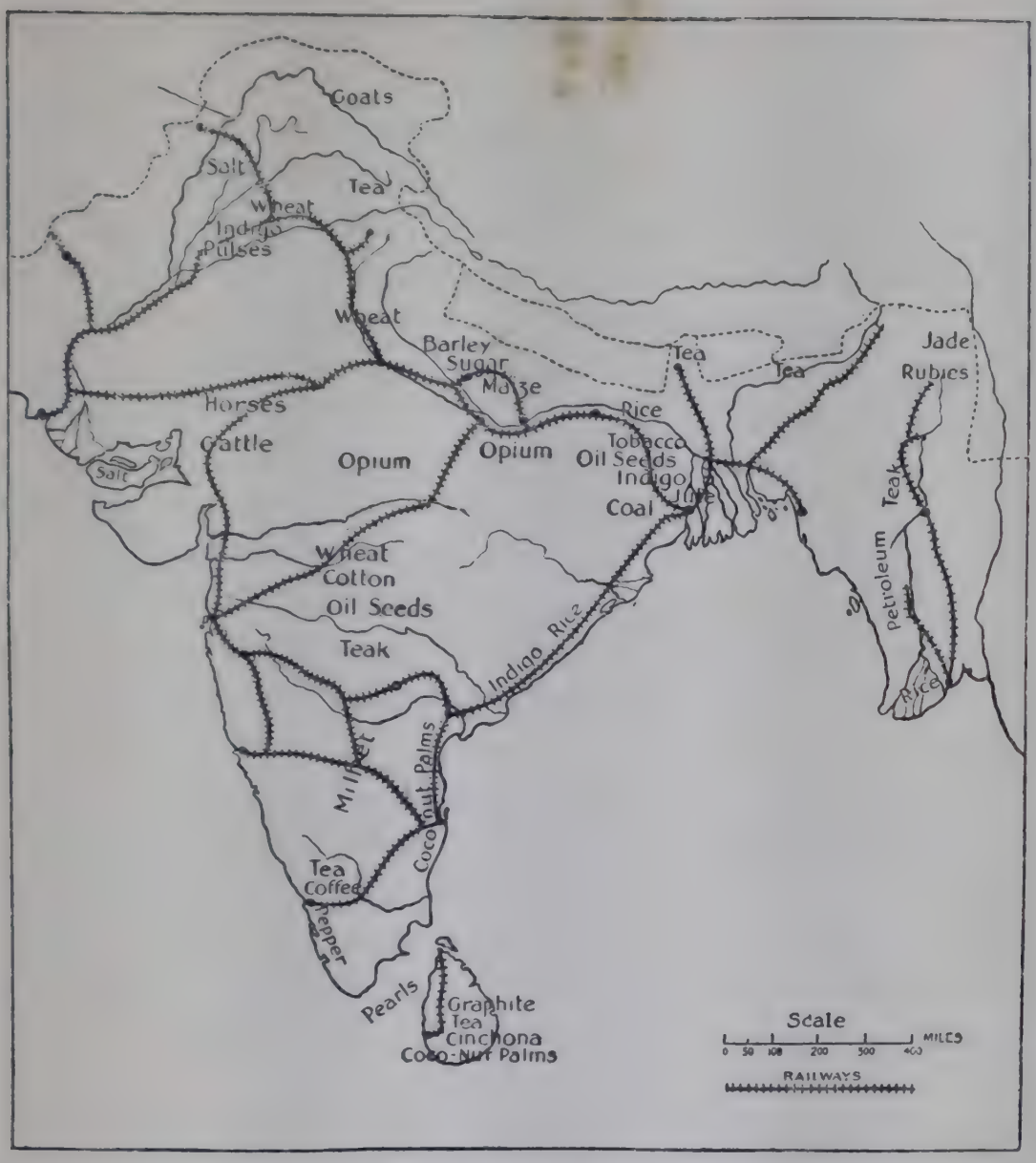
To the Hindus the Ganges is a sacred river, and especially sacred is the point of confluence of the Jumna and Ganges at **Allahabad**—'the abode of God'—as well as the city of **Benares,** with its ghats or steps leading down to the river, and frequented by pilgrims anxious to bathe in the purifying water. Both cities are diversified by numerous temples dedicated to various Hindu gods, the worship of whom is controlled by the priests called **Brahmins.** Both towns are also railway junctions, and the chief industries are metal-work and other handicrafts, in which the natives show much artistic skill.

The products of the Ganges basin are forced to find an outlet on the coast, and hence has arisen **Calcutta,** the former capital and chief port of the country, in spite of its trying climate and the difficulty of navigating the Hugli, encumbered as it is with shifting shoals. The town has at least one advantage in the proximity of the coal-fields in the Hugli basin —the most productive in India—which has encouraged its jute industry.

The Basin of the Brahmaputra.—This river rises not far from the Indus, but flows in an opposite direction, and breaks through the Himalayas by a series of inaccessible gorges. From the point where it enters Assam to its mouth, it is a broad, navigable sheet of water studded with islands. The annual floods renew the soil on which rice and oil-seeds are grown. Much of the area between the river and the tree-clad ranges to the north and south, where tea is cultivated, is a grassy jungle.

THE SOUTHERN TABLELAND.

Relief.—This occupies the greater portion of the **Deccan**—*i.e.*, peninsular India—and slopes gradually towards the east. The surface



INDIA : ECONOMIC

is diversified by highland areas separated by generally wide valleys, and is bounded on the east and west by ridges which, viewed from the coastal plains below, appear as ranges, and have been called the Eastern and Western Ghats. Of these, only the **Western Ghats** are of important continuity and altitude, and they form a serious barrier to communication between the western coast and interior. In the north the tableland rises to the **Satpura** and **Vindhya Ranges,** and has an offshoot in the **Aravalli Hills.** In the south it terminates in the group of rounded, grass-covered mountains known as the **Nilgiri Hills.** To the south of these hills, and north of a range that continues the direction of the Western Ghats to the extreme south of the peninsula, occurs the depression called the **Palghat Gap.** This forms a natural route between the

east and west coast-plains, and is followed by the railway from Madras to Calicut.

Rivers.—On account of the eastward slope of the land, the chief rivers flow into the Bay of Bengal—*i.e.*, the Mahanadi, Godaveri, Kistna, and Cauvery. These are of very slight use for navigation, on account of the variation in the volume of their water, the torrential nature of their upper courses, and the rapids that occur where they descend in deep gorges from the tableland to the coast plain. The north-eastern part of this region is traversed by the Narbada and Tapti. The **Narbada,** after passing Jabalpur, is navigable for some distance, and passes through the picturesque ravine known as the Marble Rocks. The **Tapti** is not navigable, but its valley forms a better route to the interior, and Surat, at its mouth, has a fair artificial harbour. All the west coast ports, however, save Bombay and the Portuguese settlement of **Goa,** which has two harbours, are difficult of access during the season of the south-west monsoon.

Climate.—The temperature of the plateau is moderated by altitude and by its exposure to ocean winds in summer. The south-west monsoon, forced to rise in front of the Western Ghats, deposits an excessive rainfall on their seaward slopes, and therefore often fails to bring an adequate supply to the central regions of the peninsula. In winter the north-east trade-wind blows as a dry wind over most of the Deccan, but brings a fair rainfall to the Coromandel coast-plain. Unfortunately, even when the total annual fall is fairly heavy, it sometimes occurs in the form of a few torrential downpours, which do great damage and are separated by long periods of drought that cause terrible famines. Irrigation is therefore necessary in most parts; and where the plateau is composed of crystalline rock, this is sometimes secured by constructing dams across the upper courses of the rivers, and so converting these into reservoirs (see map on p. 171).

Productions.—Those areas which are covered with the **black soil** due to the decomposition of basaltic rocks do not, however, stand in such need of irrigation; for this soil, owing to its clayey nature, is able to retain moisture for a long time. It is extremely fertile, and especially suited for growing cotton, on account of the lime it contains. Millet, oil-seeds, and wheat are also cultivated, and forests of teak occur. Elsewhere the chief timber trees are sal and sandalwood, the latter being confined to the south; and the prevailing crops are different species of

millet. Small crops of tea and coffee are grown on the Nilgiri and southern ranges, and pepper along the Malabar coast. The mineral wealth of the plateau has not been fully developed ; both coal and iron occur, but separately, and the latter in widely scattered deposits. Gold is mined in Mysore.

ENVIRONS OF BOMBAY.

Towns.—Bombay is the chief port of the west coast and great outlet for the produce of the Black Earth region. It is situated on an island, and has a large safe harbour. Its trade has grown considerably since it was connected by two railways with the interior. It manufactures cotton goods. The chief towns of the Deccan are now linked together by railways—*e.g.*, **Poona,** an important military station and manufacturing town on the line from Bombay to Madras ; and the walled city of **Haidarabad,** capital of the Native State of that name.

THE EAST COASTAL PLAIN.

This tract of low, mainly alluvial land everywhere presents very similar features ; but while the northern portion has its rainfall mainly in summer, that of the southern is mainly in early winter. The regularity of the coast-line is broken by the deltas of the rivers, which have been irrigated by canals, and by a series of shallow lagoons that are characteristic also of the south-west coast. A canal runs parallel to the east coast for some distance south of the Godavari. The coast is fringed with coco-nut palms, and rice is the staple crop, though millet and indigo are also important. The port of **Madras** owes its importance to its fertile, populous hinterland, and an artificial harbour has only been constructed at great expense. The Madras Observatory gives the standard time to India.

The chief exports of India, in order of value, are jute (raw and manufactured), cotton (raw and manufactured), rice, hides, oil-seeds, tea, and opium.

CEYLON.

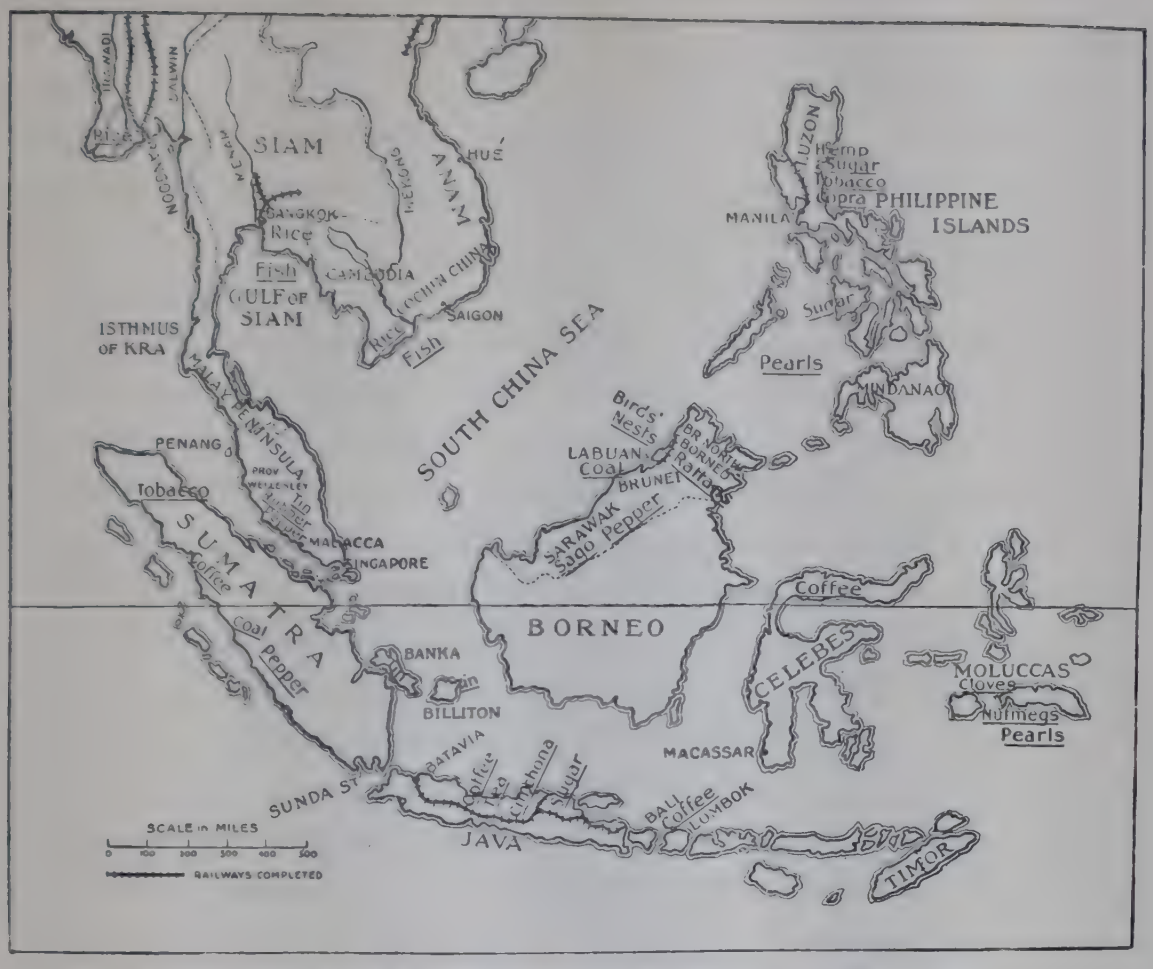
This island is separated from India by the **Palk Strait,** which is too shallow for large vessels to navigate ; and by the **Gulf of Manaar,** where some pearl-fishing is still carried on. The island is low in the north, but rises steeply towards the centre in the south. The climate is less trying than on the mainland, on account of ocean winds, which bring moisture from the north-east to the east coast in early winter, and from the south-west to the west coast in summer.

Productions.—Forests cover a large part of the island, and coco-nut palms fringe the shores. Not only are the **coco-nuts** exported in a natural condition, but the dried kernels, called copra, and the extracted coco-nut oil are also articles of trade. The fibre of the husks also is exported for the manufacture of ropes and matting, and mats are locally made from the palm-leaves. Tea has nearly supplanted the coffee plantations, which succumbed to blight some years ago ; and cacao and rubber plantations are increasing on the lower slopes. **Cinchona** trees are cultivated both as shade trees for young tea and cacao plants, and on account of the quinine obtained from their bark—the best medicine for the malarial fever so rife throughout much of India. Other important vegetable products are cinnamon, rice from the lowlands, and the nuts of the areca or betel palm, which are used for chewing in the East. The island is rich in graphite (plumbago), and some precious stones are still found, though the trade in them has diminished.

The capital of the island is **Colombo,** which has a good harbour and is the usual port of call for ocean vessels. Trincomali also has a good harbour, but its position is not so well suited for trade. **The chief exports** of Ceylon in order of value are tea, coco-nut products, plumbago, cacao, and areca-nuts.

INDO-CHINA.

This area, excluding the Malay Peninsula, consists of the following natural regions: (1) The northern highlands and a series of ranges which separate the valleys of the Songkoi, Mekong, Menam, Salwin, and Irawadi; (2) the lower valleys of these rivers, their deltas, and the coastal plains. On account of their fertility these lowlands support most of the inhabitants of the area; and since communication between them is difficult, they have generally formed separate political units. Those in the east now belong to France, and those in the west to Britain, while the central portion constitutes the independent kingdom of Siam.



INDO-CHINA AND EAST INDIES: POLITICAL AND ECONOMIC.

The Northern Highlands.—These mountains and the gorges between them are clad with forests, which are not yet fully explored, and form the home of such wild animals as elephants, bears, rhinoceros, buffaloes, and monkeys. The elephants are captured and used as beasts of burden, especially in hauling timber to the rivers, down which it can be floated for export. The most valuable timber is teak, for which Burma is noted. The area is rich in rubies, which are chiefly mined in Upper Burma, as well as in sapphires, gold, and jade. Petroleum also occurs in the Valley of the Irawadi. On account of the wild nature of the country, the district where Tongking, Siam, and Burma adjoin is almost independent, and constitutes the Shan States.

The Lowlands.—The great rivers of Indo-China are much impeded by rapids, the best waterway being the Irawadi, which is navigable for some distance north of Mandalay. Boats can ascend the Songkoi to the Chinese frontier, and the Mekong nearly to the point where it forms the boundary of Siam. All the rivers are loaded with sediment, with which they have built great deltas, and are subject to floods at the season

of the south-west monsoon. These floods are utilized in growing rice, which is the chief export of the area, and forms with fish the main diet of the inhabitants. The fish are not only caught in the sea, but also in the rivers and lakes, especially in the great Lake of Cambodia, which is connected with the Mekong River.

Population.—The majority of the inhabitants of Indo-China belong to the Mongolian family, and the prevailing religion is Buddhism. On account of the swampy nature of the lowlands and danger from floods and wild animals, the native houses are raised on piles. They are sometimes built of timber, but generally constructed of bamboo poles covered and thatched with palm-leaf matting. The following are the political divisions of the area, and the chief towns :

French Indo-China embraces Tongking, Anam, Cochin China, and Cambodia. **Tongking** occupies the basin of the Songkoi, and its chief town—**Hanoi**—is the capital of the whole of French Indo-China. The town is well built, but its harbour is only accessible to small sea-vessels. From it railways have been constructed for some distance along the Valley of the Songkoi, as well as north-eastward towards China and southward along the coastal plain.

Anam embraces the east coastal strip and a mountainous region behind. Unlike the rest of Indo-China, the rain falls here mainly in winter, and this is less favourable to agriculture. The coast towns also suffer from the force of the north-east wind in winter, and occasionally from furious cyclones, called typhoons ; so that navigation is at all times dangerous, and the chief town—**Hué**—is but a poor port. **Cochin China** mainly consists of the delta of the Mekong. The capital—**Saigon**—has a good harbour, and is connected with the Mekong by a navigable channel and a railway.

Siam is partly composed of the valley of the Menam, and partly of a low and rather arid plateau to the east. The capital—**Bangkok**—stands on the Menam, but, owing to a bar at the mouth of the river, is only accessible to small vessels. A railway has been built from the coast to Bangkok, and for some distance eastward.

Burma includes the basins of the Salwin and Irawadi. The capital —**Mandalay**—can be reached from the coast by boat up the Irawadi, or by a railway, which also extends some distance farther north. At Mandalay there is a large walled enclosure containing the old Burmese royal palace, now utilized as a British fort ; and on a hill behind the town

stands an enormous Buddhist temple with 700 pagodas. The only important port of Burma is **Rangoon,** which is accessible at high-tide to large ocean vessels. It is situated on an inlet, which is connected by a navigable channel with the Irawadi, but only at times of flood. The city consists of several well-built Government offices and private houses, as well as numerous native bamboo huts.

The chief exports of Burma are rice and teak, others being rubber, petroleum, gold, jade, and rubies.

THE MALAY PENINSULA AND EAST INDIES.

This peninsula is joined to Indo-China by the low **Isthmus of Kra.** It is separated from Sumatra by the Strait of Malacca, and along the Malay coast of this channel are situated the **British Straits Settlements.** These consist of Province Wellesley, Malacca, and the islands of Singapore, Penang, and Labuan. The isle of **Penang** is rich in tin, and has a good harbour; but **Malacca** has declined in importance on account of the silting-up of its port. The peninsula is divided into many States, of which the southern are under British protection and the northern are claimed by Siam.

Most of the East Indies belong to the Dutch, the chief being Sumatra, Java, Celebes, the Moluccas, and most of Borneo. The northern portion of the last, comprising Sarawak, Brunei, and North Borneo, is British. The Philippines belong to the United States.

Relief.—The ranges in this region, as in the Japanese Isles, are due to folding, and have determined in a marked degree the arrangement and shapes of the islands. One range forms the backbone of the Malay Peninsula, while another traverses Sumatra, Java, and the isles to the east. From Luzon, the largest of the Philippines, parallel chains run southwards through a belt of smaller islands, and reappear in Mindanao. In Borneo, Celebes, and the largest of the Moluccas, ranges radiate from a centre, and in the last two cases form the backbone of peninsulas, and in the first are separated by plains. Active volcanoes exist in most of the islands save Borneo, which rises from a submarine plateau; and this fact seems to point to a former connection with the mainland of Asia. This plateau, or continental shelf, descends rapidly east of Java and Celebes, the descent roughly corresponding with the line drawn by the naturalist Sclater to indicate where the change from Asiatic to Australian fauna occurs.

Climate.—The temperature is reduced in most parts by elevation, and moderated by oceanic winds. All regions experience a fairly heavy rainfall, which is excessive on the western slopes of Sumatra. Terrible typhoons sometimes occur near the Philippines, when the winds are changing in the equinoctial seasons.

Productions.—Combined heat and moisture have produced a prolific vegetation everywhere, and dense tropical forests abound. Some of the most valuable forest products are **gutta-percha**—the hardened juice of a tree; **pepper**—the berries of a widespread, climbing plant; **cloves**—the flower-buds of a shrub grown in the Moluccas; **nutmeg** and **mace**—the kernel and its dried covering respectively of the fruit of another shrub common in the Moluccas; and **rattans**—the canes of a species of palm, used in wicker-work, and grown largely in Borneo. Besides these, the coco-nut palm flourishes everywhere, and another species of palm is easily cultivated, from the pith of which **sago** is prepared.

Of all the East Indies, **Java** is the most productive—and hence most densely populated—on account of its fertile volcanic and alluvial soil. Its staple crops are coffee, tea, sugar, and cinchona. In Sumatra and Borneo the chief crops are coffee, tobacco, and pepper; and in the Philippines, Manila hemp—a fibre obtained from the leaf-stalks of a plantain—sugar, copra, tobacco, and cigars. A small quantity of coal is produced in the British island of **Labuan**, which is a coaling-station and possesses a good harbour. **Tin** is mined in large quantities in the Malay Peninsula, and in the Dutch isles of Banka and Billiton (see p. 334).

Towns.—The chief commercial centres are Singapore, Batavia, and Manila. **Singapore** has a magnificent harbour, and, on account of its position at the point of convergence of natural ocean routes, has a large entrepôt trade. It is also an important coaling-station. **Batavia**, the capital of the Dutch East Indies, has a good harbour, and commands the route through the Sunda Strait. **Manila**, the capital of the Philippines, is the best port in the north, and an improved harbour is being constructed.

1. Land drained to the Arctic.
2. ,, ,, ,, Indian Ocean.
3. ,, ,, ,, Pacific.
4. Land drained to the Atlantic.
5. ,, ,, ,, Mediterranean.
6. Areas of inland drainage.

⊥⊥⊥ = Canals. The darker portions of the rivers are the parts which are navigable.

ASIA: RIVER SYSTEM.

ASIA—REVISION.

CONFIGURATION AND RIVER SYSTEM.

Shape.—The mainland of Asia has a roughly quadrilateral form, plus the three large southern peninsulas of Arabia, India, and Indo-China, and the three smaller ones of Asia Minor, Korea, and Kamchatka. The east and south-east coasts are fringed with mountainous islands.

Relief.—The mountain system of Asia can be divided into—

1. **The insular ranges** that traverse the islands.

2. **The central belt of plateaus and ranges** which extends right across the middle of the continent, and broadens out in the east to include all between the Bering Strait and the Strait of Malacca. This

belt forms a serious barrier to communication between the triangular plain which occupies West Turkistan and most of Siberia in the north, and the river plains of Mesopotamia, Northern India, and Southern Indo-China. It also separates both northern and southern lowlands from the plains of Manchuria and China proper in the east. The chief plateaus and ranges which compose this belt have been enumerated on p. 150.

3. **The tablelands of Arabia and India.**

River System.—The rivers of Asia may be classified into—

1. **Those flowing into the Mediterranean and Black Sea.**—These are relatively short and torrential in character, and therefore of no use for navigation.

2. **Those flowing into the Indian and Pacific Oceans.**—These include the Euphrates, Tigris, Indus, Ganges, Irawadi, Salwin, Mekong, Yangtse, Hwang-ho, and Amur. As these rise on the margins of the central plateaus, they are long and well supplied with water from the rains and snows on the bordering ranges. Hence most are navigable for considerable distances; but an exception must be made of the Hwang-ho. They are also in many cases useful for irrigation, while the soil they bring down in great quantities has created fertile alluvial plains and deltas.

3. **Those flowing into the Arctic Ocean.**—The most important of these are the Ob, Yenisei, and Lena; but as all are frozen for most of the year and their mouths for at least ten months, and as they flow through sparsely peopled regions, there is little traffic carried on by them.

4. **Those flowing into inland seas and lakes,** and those which disappear after a shorter or longer course. Regions traversed by such rivers are called 'areas of inland drainage.' The most important rivers of this class are: the Ural, which flows into the Caspian; the Syr and Amu, which flow into the Sea of Aral; and the Tarim. These are navigable for parts of their courses, but the last three are chiefly useful for irrigation (see map on p. 183).

CLIMATE AND VEGETATION.

Asia can be divided into the following climatic areas:*

1. **The frigid region, or Tundras, in the north,** practically including the land within the Arctic Circle. Here the intense cold and drought reduces vegetation to mosses, bushes, and stunted trees; while much of the island of Novaya Zemlia is covered with an ice-sheet. Some

* For maps, see pp. 130, 131, 136, 137, 329; and for statistics, pp. 341, 342.

of the few plants found in the Arctic regions occur also in other parts of Asia on high mountains.

2. **The cool temperate region** south of the above area, where forests predominate. This includes the whole of Eastern Siberia and Western Siberia to about latitude 57°.

3. **The temperate lowlands, or Steppes,** of Western Siberia and Western Turkistan, where the rainfall occurs chiefly in early summer, and is scanty in parts. Here the natural vegetation is grass, but this is being supplanted by agriculture wherever the rainfall is adequate or irrigation possible.

4. **The plateaus of the interior,** including the tableland of Arabia and plain of Mesopotamia. These suffer from drought, and, save for a few favoured valleys where irrigation is possible, they are either barren or poor grasslands. The temperature is reduced by elevation, but differs considerably in different parts, and the seasonal range is great. The date-palm is important in Arabia and Southern Mesopotamia.

5. **The Mediterranean seaboard** is characterized by its mild, wet winters and hot, dry summers. Here vegetation has to withstand the summer drought; and hence the vine flourishes, and various fruit-trees with thick-skinned leaves (see p. 109). Wheat is also common. This type of climate and products prevails as well to some extent over the western plateaus, though, on account of the inadequate rainfall, they also belong to Class 4.

6. **The monsoon area,** embracing India, Indo-China, China, Korea, the plains of Manchuria, and the Japanese Isles. This region, with the exception of a few districts already mentioned, receives the bulk of its rainfall in summer, brought by warm oceanic winds, and is exposed in winter to relatively cold land winds. As the climate is favourable for agriculture, a large part of the area is under cultivation, the rest being occupied by forests, or mixed grass and woodland. The temperature, and therefore the productions, vary much with the latitude, but rice, tea, and cotton are characteristic crops throughout the greater part of the region. One of the most typical products of this area is the bamboo, while the coco-nut palm thrives in the south.

7. **The equatorial districts,** embracing the Malay Peninsula and East Indies. Here, on account of latitude and oceanic influences, the range of temperature is slight, and the average is high, but moderated by altitude in many parts. The rainfall is heavy and occurs at all seasons,

though it is generally heaviest about the period when the sun is highest. The districts are well supplied with forests, and yield such products as coco-nut, sago, rubber, and various spices. There are also important plantations of coffee, sugar, and tobacco.

FAUNA.

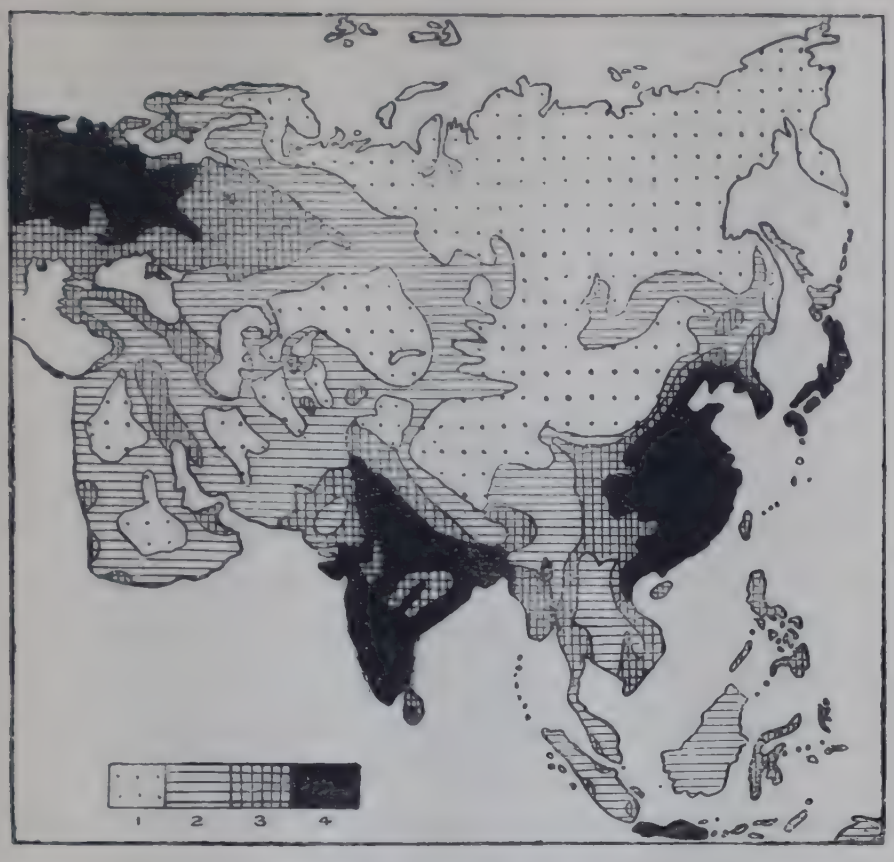
The land surface of the world has been divided into certain areas called zoological provinces, each province being characterized by the presence of a large number of similar native animals, and the absence of others. From the map on p. 331 it will be seen that, while Northern and Western Asia fall within the Palæarctic province, and Arabia into the Ethiopian, South-Eastern Asia constitutes the Oriental province.

The Palæarctic Province.—The southern limit of this is not really a line, but is formed by the belt of plateaus across Asia, which has constituted a barrier to the dispersal of animals. Although this is the largest of the provinces, it does not contain a remarkable number of distinct native genera of mammals; but one group that is much represented includes those hoofed animals of most use to man—the horse, ass, ox, camel, sheep, deer, goat, pig, etc. Most of these inhabit the steppes, but the reindeer lives on the moss of the frigid Tundras, and the camel can find support on the few prickly plants and shrubs which grow in the deserts. A one-humped and a two-humped species of camel occur in Asia. The yak is a kind of ox native to the central ranges.

The carnivorous, or flesh-eating, animals are represented by the wolf, fox, polar and brown bears, and lynx. The tiger is also found in Persia, Turkistan, and Northern China; while the leopard occurs in South-West Asia. There, too, the lion is still found, though it is essentially an Ethiopian animal, and is increasingly rare here. Some of these animals are hunted on account of their skins, but many of the most valuable furs are obtained from the squirrels, ermines, and beavers which inhabit the northern forests.

The Oriental Province.—This is characterized by a particularly rich and varied fauna, especially in the Malay Peninsula. It possesses a large variety of monkeys and the orang-outang. The chief carnivorous animals in this region are the tiger, leopard, hyena, and bear; other large native wild animals being the elephant, the tapir, and both the one-horned and two-horned species of rhinoceros.

Many varieties of oxen, deer, antelopes, and sheep, occur in this province, and some of the most useful animals of draught are the Indian



ASIA : POPULATION.
(1) Less than 1 person per square mile ; (2) 1-50 ; (3) 50-100 ; (4) over 100.

buffaloes and humped cattle. The region is also very rich in birds and reptiles, possessing, among many varieties of snakes, the dreaded cobra.

The Ethiopian Province.—Arabia has a fauna which resembles that of the Sahara, and is characterized by such large animals as the lion, the one-humped camel, and many kinds of antelopes.

POPULATION AND RACES.

Population.—The distribution of population given on the map above, shows the strong influence of the distribution of rainfall (see p. 133). Population is densest in the monsoon area, and particularly in the fertile plains of India, China, and Japan. It is also very dense in the tropical island of Java. Population is naturally exceedingly sparse in the cold regions of the far north, and in the deserts on the high plateaus of Central Asia, as well as in those of Arabia. It is fairly dense, and capable of considerable increase, around the sea-board of the Mediterranean, in Mesopotamia, and Southern Siberia.

Races.—The following races are represented in Asia :

1. The Caucasian races, to which belong the Georgians of the Caucasian

region, who were supposed by some ethnologists so well to represent the most typical features of the primary stock that the name 'Caucasian' was given to this group of races. (2) The Semitic races of Arabia and Syria. (3) The Armenians and Kurds of Eastern Asia Minor, the Iranians of Persia, the Afghans and natives of Baluchistan. (4) The Hindus of North India, who speak an Aryan language. Those speaking a Dravidian language in the south are of doubtful origin. (5) The Slavonic peoples who have spread from Russia over parts of Southern Siberia and Russian Turkistan. (6) A few British in India and French in Indo-China—for the most part only temporary officials in those countries.

The Mongolian Races.—To these belong about two-thirds of the total population of Asia. They can be classified as follows: (1) The Northern Mongolians, or Mongolo-Tartar, including—(*a*) The tribes inhabiting northern Siberia, who are akin to the Lapps of Europe. (*b*) Many tribes of Southern Siberia and Turkistan, as well as the Ottoman Turks. (*c*) The Japanese and Koreans. (*d*) The Manchus, who dwell in Manchuria but are also found in China, a country they invaded about 250 years ago. Their supremacy there has recently been overthrown. (*e*) The Mongols proper, whose native home is Mongolia, but who have frequently invaded other areas in past times.

2. The Southern Mongolians, who include the inhabitants of—(*a*) Tibet, (*b*) China proper, (*c*) Indo-China, (*d*) Burma and the Himalayan slopes in India.

3. The Oceanic Mongolians, who form the bulk of the inhabitants of —(*a*) the Malay Peninsula, (*b*) the East Indies and Formosa. In these races the usual Mongolian traits of yellowish hue oblique eyes, and prominent cheek-bones are less pronounced than in the other divisions.

The Negro Races.—Though there are no true negroes in Asia, a few of the inhabitants of the Malay peninsula, and the East Indies, as well as those of the Andaman Isles are thought to belong to a branch of the Negro race called Negrito. The chief characteristics of the Negritos are small stature, dark-brown hue, and wavy or tufty black hair.

Negroid characteristics have been detected by some ethnologists in the Dravidians of Southern India and Ceylon, but the origin and extent of this element are uncertain matters.

For statistics *re* population, see p. 348.

NORTH AMERICA.

THE DISCOVERY OF AMERICA.

THE lands of the globe fall naturally into two great divisions on account of the separation caused by the Pacific and Atlantic Oceans. Of these the Pacific, on account of its greater extent, has proved the greater barrier between North and South America, or the **New World**, and the other continents. Its size seems to have prevented any communication between America and the Asiatic shores in historic times before the sixteenth century ; at any rate, we have no record of any. Still, it is possible that men may have entered America from Asia by crossing the **Bering Straits**, which are now shallow, and only 36 miles across, and may then have been narrower or even non-existent. It is true that the **American natives** have many distinctive and peculiar characteristics, but yet in some respects they do resemble the Mongolian races of Eastern Asia ; and if emigration from Asia took place very long ago, differences would naturally have developed in course of time.

Turning now to the Atlantic, we see it is narrowest in the extreme north, and between Africa and Brazil. The distance across the ocean in the north is also broken by Iceland and Greenland, which are connected with Europe and America respectively by shallow submarine ridges. It was from Iceland that, in the tenth century, some Norsemen under **Eric the Red** sailed to Greenland and settled there. Eric most inappropriately called it Greenland, because, he said, 'men will desire much more to go to the land if it has a good name.' Some years later his son **Leif** was accidentally blown southwards on a voyage to Greenland from Norway, and saw fresh lands, which he afterwards visited. It is now supposed that these lands were part of North America, though it is difficult to determine the exact place from existing records.

We are on much more certain ground in dealing with the discoveries of **Columbus**. He started, August 3, 1492, on his westward voyage from Palos, in the south-west of Spain, under the erroneous impression that he could reach the east coast of Asia more quickly by this route than by going eastwards. He had no idea that a great continent and another ocean lay between him and his goal ; and when he reached some islands he thought they were some of the Indies off the south-east shores of Asia. In course of time the name 'West Indies' was

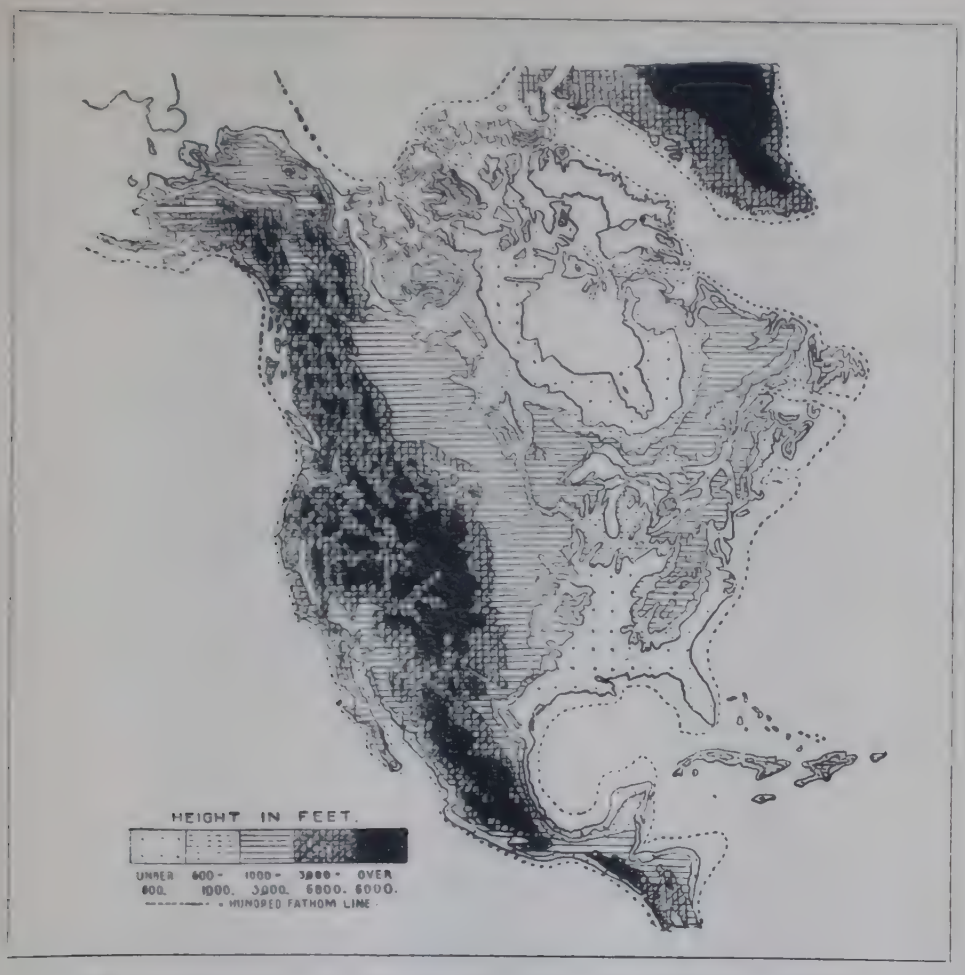
applied to the islands thus discovered by sailing westwards, while the others are known as the East Indies. On his outward voyage Columbus sailed sufficiently southwards from Spain to benefit by the north-east trade-wind ; and when, after visiting a few of the islands, he wished to return, he first sailed northwards until he was able to utilize the prevailing south-west winds. The route adopted by Columbus on his first voyage was followed, with slight variations, in most of the other early expeditions ; so that the central portion of the New World was the part that first became well known. In 1497 **John Cabot,** who sailed from Bristol, took, however, a more northerly route, and very probably came across Newfoundland, which so markedly projects eastward.

The other part of America which likewise projects eastwards—namely, Brazil—was, in 1500, the scene of **Cabral's** landing, who sailed under Portuguese auspices. This land was claimed and gradually settled by the Portuguese, while the West Indies and the rest of Central and South America were conquered and occupied by Spaniards.

In 1501 the King of Portugal sent an Italian named **Amerigo Vespucci** to explore the coast of Brazil, and he seems to have coasted southwards for a considerable distance. The extent of his discoveries coming to the knowledge of a German professor, who was just then writing a treatise on geography, he suggested in this that the name America, after Amerigo, should be given to what is now known as South America, and applied it thus on a map that he published. The idea was adopted by the public, and gradually the name was given to the northern as well as the southern continent.

It was only very slowly that men realized the extent of the New World, and that it was quite distinct from Asia. The narrow isthmus of Panama was first crossed in 1513 by a Spaniard named Balboa, who was thus the first to see the ocean on the other side that still separated him from Asia. It was found that the desired water route from the Atlantic to this ocean and Asia had to be sought in the far south or far north. That in the south was first found by **Magellan,** who sailed through the straits that bear his name in 1520.

The finding of the **North-West Passage,** as the sea-way north of America is called, proved a more difficult matter on account of the climate. Many of the names of the channels of water here recall the men who dared and suffered so much in this search. Such, for example, were **Davis,** and **Baffin,** and **Hudson,** who lost his



NORTH AMERICA: RELIEF. (After the Diagram Co.)

ROUTE OF COLUMBUS ON HIS FIRST VOYAGE ACROSS THE ATLANTIC.

life in the bay that bears his name ; while **Franklin Strait,** between North Somerset and Prince of Wales Islands, reminds us of another ill-fated expedition in more recent times. Not until McClure's voyages north of Canada in 1850-1856 was this water route ever completely traversed, and only once since has this been accomplished, namely, by Captain Amundsen, who took a ship through from east to west in 1903-1906.

Thus the insular character of the New World was finally established ; but, bearing in mind the length of time occupied in this process, we can understand what Fiske means when he writes : ' It is well to bear in mind that, though we often speak of America as being discovered in 1492, in reality the discovery of America was not a single event, but a very gradual process. It was not like a case of special creation, for it was a case of evolution, and the voyage of 1492 was simply the most epoch-making incident in that evolution.'

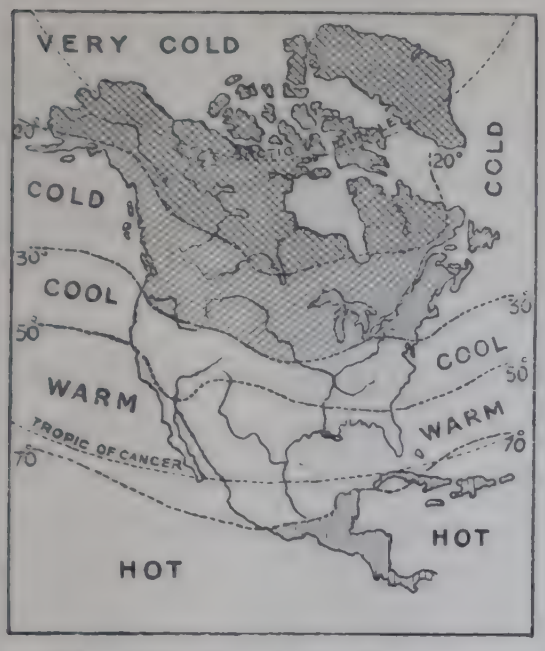
CONFIGURATION.

If we consider that North America extends to the Isthmus of Panama, we find that its area is about two and half times that of Europe, and its shape far more compact.

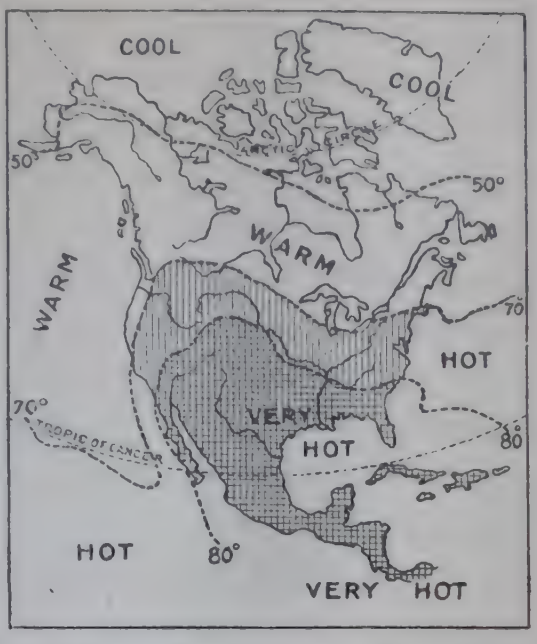
It is roughly triangular, being bounded by the Arctic, Atlantic, and Pacific Oceans, while the regularity of its coast-line is broken by four large openings from these oceans, forming Hudson Bay and the Gulfs of St. Lawrence, Mexico, and California. Hudson Bay is very shallow, and the entrance to it is partly barred by Southampton Island and Baffin Land. Newfoundland stands somewhat similarly at the entrance to the Gulf of St. Lawrence ; while the West Indies not only interfere with communication by water between the Atlantic and the Gulf of Mexico, but also separate both from the Caribbean Sea. Many islands lie to the north of America, including the large one called Greenland.

GREENLAND.

This large island lies buried under ice, save for a few mountain summits and for some small isolated areas along the narrow coastal plain which have afforded sites for Eskimo settlements. These **Eskimos** support themselves by fishing and hunting. Their small boats (called kayaks) are made of drift-wood covered with sealskin, and their sledges are



Mean Isotherms for January.



Mean Isotherms for July.

NORTH AMERICA.

drawn by dogs. In summer they dwell in tents made of skins, which are easily carried from place to place as they wander in search of fish or game; but in winter they settle down and build huts of stone, or of snow if stone is not available. Animal fat forms their chief food and fuel, while their clothing consists of furs and skins. Some of the Eskimos have proved a great help to explorers, and several accompanied Peary on his successful expedition to the North Pole via Baffin Bay and Smith Sound in 1909. Greenland belongs to Denmark.

BRITISH NORTH AMERICA.

The Dominion of Canada and Newfoundland cover an area rather larger than the United States and smaller than Europe. Its political divisions (called provinces) can be seen on the map on p. 197, but it is here divided into the following natural regions: (1) Newfoundland and the Laurentian plateau encircling Hudson Bay; (2) the valley of the St. Lawrence; (3) the peninsula between Lakes Ontario, Erie, and Huron; (4) the maritime provinces; (5) the middle belt of lowlands; (6) the western highlands.

Climate: Temperature.—The extreme north of Canada extends into the cold Frigid Zone, but the greater portion lies in the northern or cool part of the Temperate Zone. Being so far north, the seasonal differences of temperature are very marked and the range is very great

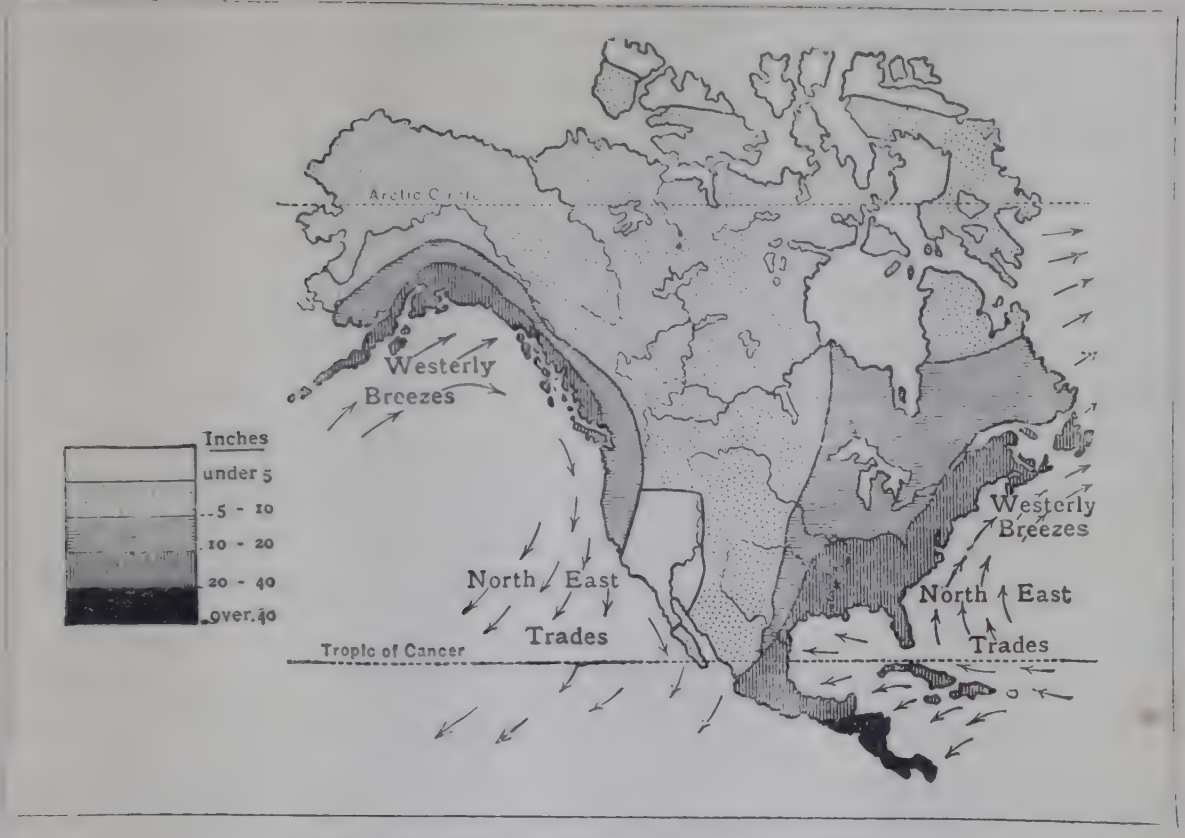
in the middle lowlands, which are removed from the moderating influence of oceanic winds. The absence of ranges in the north leaves the country exposed to cold winds from that quarter. The temperature is lower in Eastern than Western Canada in the same latitude. The warmth of the western seaboard is due to its exposure to the prevailing south-westerly winds, which are especially warm in winter.

Currents.—The western coasts also benefit by a comparatively warm current, while those on the east suffer from the cold **Labrador current** which flows southwards from Davis Straits. This cold current meets a warm current called the **Gulf Stream** off Newfoundland. The Gulf Stream flows from the Tropics along the eastern seaboard of the United States, and, despite its name, only a small branch of it passes through the Gulf of Mexico. The Gulf Stream is noted for its rapidity near its origin, as well as for its high temperature, but beyond Newfoundland loses its distinctive character, and merges into the North Atlantic Drift created by the south-west wind. The union of the cold air over the Labrador current and the warm moisture-laden air over the Gulf Stream often causes fogs off Newfoundland (see p. 317).

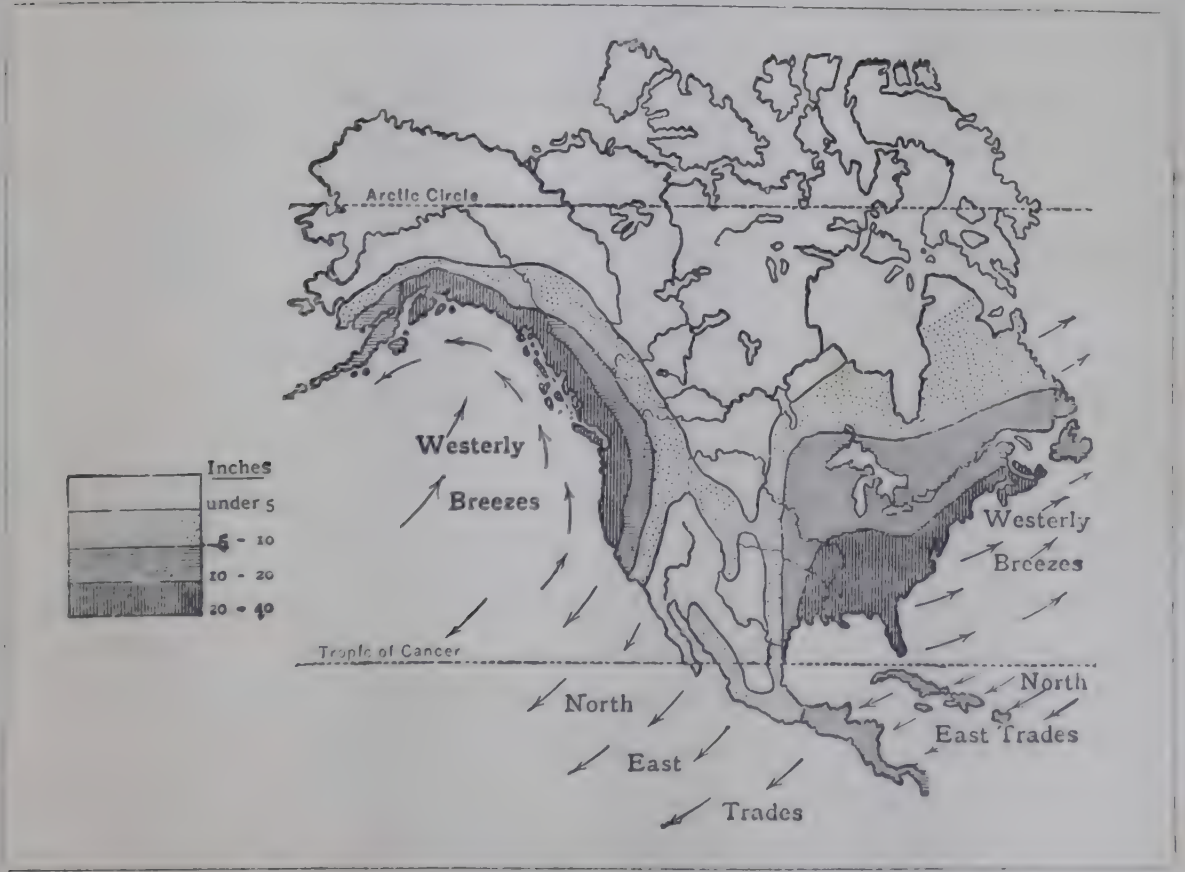
Rainfall.—The rainfall is heaviest on the western seaboard on account of its exposure to the moisture-ladened south-westerly winds and the presence of high ranges behind (see p. 207). These ranges deprive the winds of much of their moisture, so that the interior has a somewhat scanty supply. What falls here comes chiefly in summer (see p. 195). The rainfall in the far north is very slight on account of the cold, which prevents evaporation.

NEWFOUNDLAND.

Newfoundland obstructs the entrance to the Gulf of St. Lawrence, and forces traffic either north via the Straits of Belle Isle—which is unfrozen only five months of the year—or south through the channel which divides Newfoundland from Cape Breton Island—which is free from ice for a longer period, but involves a longer route from England. The island is rather larger than Ireland, and has a rocky coast deeply indented by fiords on the north and south. The interior rises in a succession of ridges, which are scantily wooded and in places barren, while the whole surface is dotted with lakes. The capital of Newfoundland—**St. John's**—possesses a fine harbour, and forms a good centre for the fishing trade. Valuable iron-ore is found not far off, and is taken



NORTH AMERICA: MEAN SUMMER RAINFALL.



NORTH AMERICA: MEAN WINTER RAINFALL.

to be smelted at Sydney, on Cape Breton Island ; for the coal in Newfoundland is as yet little worked. With Newfoundland is politically associated the coastal strip of Labrador.

The fisheries around Newfoundland are remarkably rich. They owe their existence to the slime brought hither by the cold Labrador current, which furnishes food for the fish, and to the ice-floes, on which in the spring seals rear their young. The seals are then an easy prey, and are killed on account of the oil they yield and for their skins, though these are not the fur-bearing species. The waters most famous for fish are those over a submarine plateau south-east of Newfoundland, known as the **Great Banks**. Here cod and herring are caught in large numbers, the season lasting from June to November, and both are salted and dried in the sun on the island on stages erected for the purpose.

THE LAURENTIAN PLATEAU.

This is composed of ancient crystalline rocks, which have been worn down till the surface consists of low, rounded hills and shallow rock basins. Some of these basins are full of clear water, some are swamps, and some, having been filled up with glacial deposits—for the whole of Canada was long ago covered with a great sheet of ice—form fertile oases in a region elsewhere deficient in soil of any depth.

Rivers.—Many of the rivers consist of alternate lake-like expanses and rapids, which render navigation dangerous for any vessel save the light birch-bark canoe. This boat, of native Indian construction, on account of its lightness is often able to ' shoot ' the rapids without being swamped in the whirling waters, or, where this is impossible, it can easily be carried past the falls. Some of the rivers flow into the St. Lawrence ; others into the series of lakes connected by the **Mackenzie,** a few into the Arctic Ocean, as the **Back River**; but the great majority into Hudson Bay. Two of this last group are the **Churchill River,** which has a fair natural harbour at its mouth—Fort Churchill—and the **Nelson,** which flows from Lake Winnipeg, but is badly obstructed with rapids. Both are only free from ice for five months of the year. The chief tributary of the St. Lawrence, the **Ottawa,** is navigable as far as the town of Ottawa, and is connected by a canal with Kingston at the east end of Lake Ontario. The chief value of these rivers lies in the means of transport, which, especially when swollen by the spring floods caused by the thaw, they afford for the timber cut in the forests, and in their

BRITISH NORTH AMERICA: PHYSICAL AND POLITICAL.

water-power, which is utilized for saw-mills and mills for the conversion of timber into wood-pulp and paper.

The Barren Lands of the far north are the only part of the Laurentian plateau which is not forested. A thick layer of lichens and mosses takes the place of trees, and forms the covering of what is a swamp in summer and a frozen waste in winter. Yet even here bright flowers appear during the short summer, and innumerable wild-fowl flock hither from the south to rear their young ; while the species of reindeer known as the cariboo, which lives on moss, roams over the plains. The same type of scenery prevails westward throughout Arctic America, but further south the forests begin, and broaden out towards the east over the rest of the Laurentian plateau.

Hunting and trapping animals for the sake of their skins forms the chief occupation of the Eskimos and Indians who dwell in the northern forests. The chief animals killed are deer, bears, foxes, lynxes, beavers, martens, and ermines, the furs of which are taken to trading stations called forts erected by the Hudson Bay Company, and sold or bartered for other goods.

Further south the chief occupation is **lumbering,** or cutting down the trees and transporting the logs. Parties of men go into the forests every autumn and spend the winter in this occupation. The hard frost and the snow render it possible to cross lakes and swamps at that season, and to make roads in all directions along which the logs can be easily hauled. When the spring floods come, the logs are allowed to float down the rivers in 'drives,' sometimes extending for a mile in length, and men follow to prevent their hitching in the banks or creating great dams. Thus in time the logs reach some convenient place where mills have been established, and are landed and sawn up, or they are formed into rafts which can be towed by steamers till a suitable place is reached for transferring the logs to ocean vessels for export. A large amount of timber also crosses the Great Lake or goes by rail into the United States.

Ottawa, the capital of the Dominion of Canada, has the largest saw-mills in the country, as it benefits by the power derived from the Chaudière Falls on the Ottawa River a few miles above this point. This and **Sudbury,** where nickel and copper are mined, are the only important towns in the area. The infertility of the land has caused the population in the provinces of Quebec and Ontario to be mainly confined to the two following regions.

THE VALLEY OF THE ST. LAWRENCE.

The St. Lawrence, with the Great Lakes, forms a very important commercial route into the heart of North America. The river is, however, ice-bound for about four months every year, and has various rapids and falls which have necessitated the cutting of canals to enable sea-going vessels to reach Lake Superior. Large ocean vessels can pass about a thousand miles up the river to Montreal; but here goods have to be transhipped to smaller vessels, as rapids occur, and the canals made to avoid them are not over 14 feet deep. Another canal has been made to avoid the Falls of Niagara, though a great deal of trade is diverted at Buffalo to the Erie Canal and Mohawk-Hudson route to New York. The Sault Ste. Marie, or 'Soo,' canals were necessitated by rapids between Lake Superior and Lake Huron, and the traffic on these canals is said to exceed that by the Suez, so important is this outlet for the produce of the central and western regions. It is proposed to cut a canal from Ottawa to Georgian Bay at Lake Huron (see p. 201).

The **Falls of Niagara,** which are about three-quarters of a mile wide and 150 to 167 feet high, are caused by the River Niagara's having to fall over the northern edge of the upland region on which Lake Erie is situated in order to reach Lake Ontario. The steep slope or escarpment which terminates the upland is capped with a layer of hard limestone. Though the force of the water has gradually cut a gorge extending 6 miles back from the face of the upland, the capping of hard rock still necessitates a fall, since the softer shales below are worn away more rapidly than this top layer, pieces of which only gradually break off and tumble down from the water eroding along cracks in the limestone and the influence of gravity. The falls are divided by Goat Island into the American Fall and the Horseshoe Fall. The American Fall, Goat Island, and half the Horseshoe Fall belong to the United States, and the other half of the Horseshoe Fall to Canada.

The St. Lawrence enters the ocean by a deep estuary due to submergence in the past, but navigation is rendered difficult by the prevalence of fogs and the rapidity of the current. The Valley of the St. Lawrence is fertile, and the whole length is lined with villages and towns.

Quebec is situated where the estuary of the St. Lawrence contracts to less than a mile in width; the name is the Indian word for 'narrows.' Here the Heights of Abraham rise on the left bank of the river from a

promontory, which is protected on the north by a tributary. Such a natural fortress was not to be overlooked in early days, and was first occupied by the French under Champlain in 1608. Though the city was captured by Wolfe in 1759, its inhabitants are still mainly French, and Roman Catholic. The improvement of the navigation of the St. Lawrence above Quebec has meant the loss of much of its shipping trade, as ocean vessels now go on to Montreal. Its timber trade, too, has suffered from the erection of mills nearer the sources of supply. It has, however, a tanning industry, aided by abundant local supplies of bark, and manufactures boots and shoes.

Montreal, the largest city in Canada, and still growing rapidly, has many natural advantages. It is built on an island in the St. Lawrence, at the mouth of the Ottawa, which forms an important route westwards, and not far from another tributary, which defines a route southwards to the Hudson valley and New York. It has thus become a centre for trade, and is the terminus of the Canadian Pacific Railway, and the lowest point where a railway crosses the St. Lawrence—in this case by a bridge $1\frac{3}{4}$ miles long. It stands also at the head of ocean navigation. The city derives its name from the hill which rises behind the river terraces on which it is built, and is known as Mount Royal.

THE LAKE PENINSULA.

This is the most southern portion of Canada, and on account of its fertile soil and relatively mild climate has become the most densely-populated part of the country. The chief crops are wheat ; oats, used in rearing the horses for which Ontario is noted ; maize, which is cultivated for cattle fodder ; and barley, used for feeding pigs and for brewing. Large quantities of peaches and other stone-fruits, as well as grapes, are grown in the Niagara peninsula, and apples in many parts. On account of the rich pastures, stock-rearing and the manufacture of cheese are also important industries.

Toronto, the capital of Ontario, has a fine harbour on Lake Ontario, and is situated where a change in the direction of the shore of the lake compels the railway from Montreal to branch and send diverging lines over the peninsula. The Grand Trunk Railway-line continues south-west from Toronto through **Hamilton,** a port at the head of the lake noted for its iron industry, and on to cross into the United States at Detroit.

THE ST. LAWRENCE.

THE MARITIME PROVINCES

New Brunswick, Nova Scotia (including Cape Breton Island), and Prince Edward Island, consist of generally low and fairly fertile land. The coasts are much indented, and the Bay of Fundy has a great effect on the tides, causing a difference of about 50 feet between low and high water. These indentations form good sites for harbours, which have the advantage of being very rarely frozen, though subject to fogs. The climate is cold for the latitude, and damp. The chief crops are oats and potatoes, which are extensively cultivated in Prince Edward Island, where good pastures also promote dairy-farming. In Nova Scotia, the district which slopes to the Bay of Fundy has become world-renowned for its orchards. Most of the area is, however, heavily forested, and New Brunswick ranks next to Quebec in the value of its lumber industry.

Fredericton, the capital of New Brunswick, is a great centre of the lumber trade, and benefits by its situation at the limit of navigation for large steamers. Much of the timber is exported from the chief ocean port, **St. John,** and regular lines of steamers run from here to the United States, the West Indies, and Great Britain. It is also a fishing station, the chief fish caught in the district being herrings, sardines, salmon, and lobsters, besides oysters off Prince Edward Island.

Halifax, the capital of Nova Scotia, is also a port with a magnificent harbour and a fishing centre. It is the nearest port on the mainland to Britain, and is strongly fortified. Coal is mined both in Nova Scotia and on Cape Breton Island, where its occurrence has encouraged the rise of an iron undustry at **Sydney,** the iron being brought from Newfoundland.

THE MIDDLE LOWLANDS.

The northern region is drained by the Mackenzie and other rivers which link together Lake Athabasca, Great Slave Lake, and Great Bear Lake. The scenery varies from that of the Barren Lands in the north to that of the forests further south.

The southern region is drained by the rivers which flow into Lake Winnipeg, namely, the Saskatchewan, which is navigable for steamers as far as **Edmonton,** the capital of Alberta, and the Red River. **Wheat** is the chief crop here, the most productive lands lying in the Red River Valley near Winnipeg, though in southern Saskatchewan also the yield is important. The rainfall is everywhere rather scanty for the needs of

agriculture, but it comes chiefly in early summer, when most required, and is supplemented by the melting of ground-frost and snow. The sharp frosts prevent the sowing of the seed till late in the spring in most parts, and there is sometimes a danger of the crop being nipped by an early autumnal frost before it can be harvested. The grain is stored in special buildings called elevators till a convenient time occurs for its removal, a process much facilitated by the construction of the Canadian-Pacific and Canadian Northern Railways. Along the Canadian-Pacific line lie the most important places, including **Winnipeg** capital of Manitoba, and **Regina,** the capital of Saskatchewan. The latter town is the headquarters of the North-West Mounted Police, who patrol these plains.

Further east, in Alberta, the chief occupation is cattle-ranching, for which **Calgary** is a great centre. This industry benefits by the dry, warm south-west winds, called Chinook, which melt the snow east of the Rockies, and often enable the cattle to be out all the year round. They also sometimes in summer convert the 'bunch grass' (so-called from its peculiarity of growing in tufts) into hay while yet uncut.

THE WESTERN HIGHLANDS.

1. SOUTHERN BRITISH COLUMBIA.

The general parallelism of the ranges which constitute the western highlands is here very well shown, and can perhaps best be realized by tracing the course of the Canadian-Pacific Railway. The first mountains encountered after crossing the plains of Alberta are the **Rockies,** which rise in sheer wall-like cliffs to the height of a few thousand feet, and are crowned with peaks, some of which are over 10,000 feet high. The main line utilizes the Kicking Horse Pass, which is about 5,300 feet high, and the southern branch of the railway, the Crow's Nest Pass, which is about 1,000 feet lower. For long distances these lines have to be protected by sheds from the avalanches of snow which at times rush down from the snow-fields above, and in winter the snow-plough is constantly at work. Coal is mined just west of the Crow's Nest Pass, and also at the eastern basis of the Rockies, while gold, silver, copper, and lead are found along the western base of the Rockies. The line over the Crow's Nest Pass was made on account of the mineral wealth here, and has been carried on to Rossland, a great mining centre south of the Selkirk Range.

The **Selkirks,** which necessitate an ascent of 4,500 feet for the main railway-line, have been likened to the Swiss Alps, with their snowy crests and dark pine forests. Owing to the moist climate there is a dense undergrowth of ferns. Two other ranges, the **Gold Range** (which still furnishes some gold) and the **Cascade Mountains,** have to be crossed before the coast is reached ; but these are lower, and the cañon cut by the Fraser defines a route through the latter. Both are valuable sources of timber, though it is on the coastal plain and in Vancouver Island that such trees as the Douglas fir and hemlock attain gigantic heights.

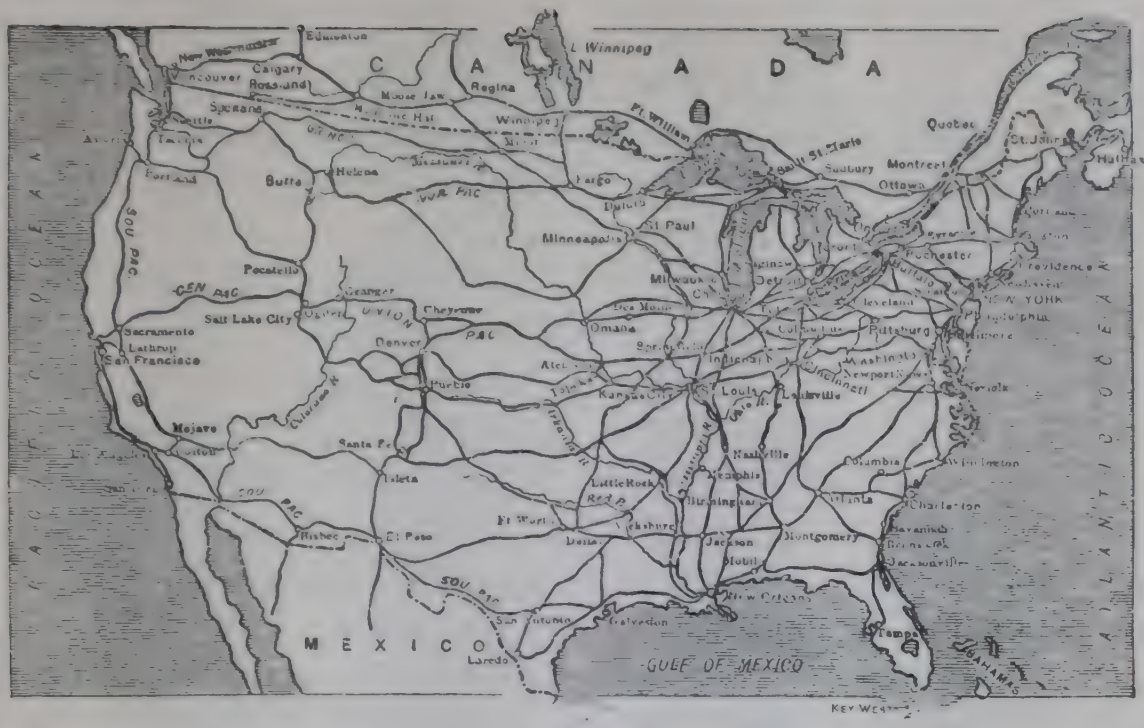
Many of the rivers of British Columbia are noted for salmon, and curing the fish is one of the principal industries along the **Fraser,** especially at **New Westminster,** which stands at the head of navigation for large steamers. The delta of the Fraser forms rich agricultural lands, and farming and fruit-growing are also carried on in many of the inland valleys. A little to the north of the mouth of the river stands **Vancouver,** which has a fine natural harbour and is the terminus of the Canadian-Pacific Railway.

Victoria, the capital of British Columbia, is situated at the south of Vancouver Island. It, too, has a good harbour, and is the headquarters of a fleet for catching fur-bearing seals, and the calling-place of many lines of steamers. It has an iron industry, for both coal and iron are found in a small isle between Vancouver Island and the mainland.

2. THE BASIN OF THE YUKON.

This area is bounded on the south-west by ranges which include some of the highest mountains in the continent, and culminate in Mount Logan (19,000 feet), Mount St. Elias (18,000 feet). In the Alaskan peninsula the mountains are volcanic and relatively low ; they reappear further west to form the Aleutian Isles.

The **Yukon** is navigable from June to October for shallow-river steamers to the junction of the Pelly. A bar at the mouth hinders the entrance of large vessels, and the delta is unsuitable for the site of a port. The commercial value of the Yukon depends on its being an outlet for the gold of the Klondike fields near Dawson City, and of other gold-fields in South Alaska. One great drawback to the development of these rich deposits is the difficulty of reaching them, though a railway has been built from Skagway, a port in Alaskan territory, over the White



CANADA AND THE UNITED STATES: CHIEF RAILWAYS.

Pass to a tributary of the Yukon. Coal exists in the Klondike area.

Alaska belongs to the United States, which also possesses a few islands in the Bering Sea, noted as the resort of the fur-bearing seals.

COMMERCE.

The chief exports of Canada in order of value are wheat and flour, wood and manufactures of wood, cheese, silver, fish, hides, and furs, bacon, gold, and fruits. The two countries with which Canada chiefly trades are the United States and the United Kingdom.

Railways.—The facilities for internal communication by water and rail have been already described; but it may be well to notice that the Canadian-Pacific Railway has an advantage over other trans-American lines, both because it has less high land to traverse in the west, and because distances east and west round the world diminish towards the poles. For the latter reason the Grand Trunk Pacific Railway Company has begun making a trans-Canadian line still further north, which will probably cross the Rockies by the Yellowhead Pass at a height of 3,700 feet, and terminate opposite Queen Charlotte Island. The Canadian Northern Railway has also been extended from Edmonton to the base of the Rockies, which it is proposed to cross by the same pass and to continue to Vancouver.

THE UNITED STATES.

The country can be divided into—(1) the Eastern Highlands; (2) the Atlantic Coastal Plain; (3) the Prairies and Gulf Plain; (4) the Great Plains; (5) the Western Highlands.

Climate; Temperature.—The United States lies in the southern and thus warm portion of the North Temperate Zone, but on account of the size of the country, which is more than equal to three-quarters the area of Europe, the temperature varies considerably in different parts. The range of temperature is great in the Prairies, Great Plains, and Western Plateaus (see map on p. 193).

Rainfall.—The Eastern Highlands and Atlantic Plain enjoy a good rainfall at all seasons. Much of this rainfall is due to cyclones, which develop in the west and cross the country in an easterly or north-easterly direction. Winds blow inwards towards the centre of these areas of atmospheric depression, and these winds are moisture-laden when they blow from the Atlantic towards approaching cyclones. The central lowlands enjoy a fair rainfall, most coming in summer, when winds blow inwards towards the heated interior from the Gulf of Mexico. West of about longitude 100°, however, the rainfall is inadequate for agriculture, and is extremely scanty on the western plateaus, which are partly cut off from the influence of sea-winds by ranges. Along the Pacific seaboard the rainfall is heavy in the north, but diminishes towards the south. It is brought by the south-westerly winds, which only blow strongly as far south as the district round San Francisco in winter, and never still further south. The climate of the Californian Valley, behind San Francisco, is, in fact, like that of the Mediterranean.

THE EASTERN HIGHLANDS.

THE NORTHERN APPALACHIANS.

This district consists of ranges and mountainous masses which extend from the St. Lawrence Valley to the sea, for there is no coastal plain here save for Cape Cod. Politically the area embraces the six New England States of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and Rhode Island, which were early settled by the Puritans.

Industries.—In Maine the chief industry is lumbering, as well as saw-milling and the conversion of wood pulp into paper, for which

NORTH AMERICA: MEAN ANNUAL RAINFALL.

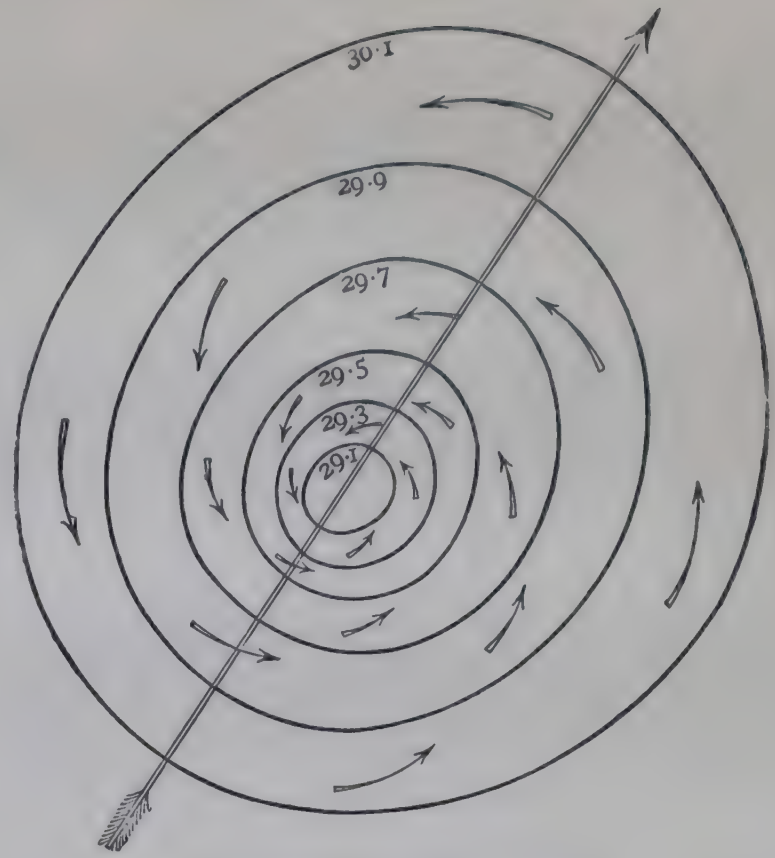


DIAGRAM OF A CYCLONE.

The figures attached to the isobars show the distribution of pressure, and the small arrows the resultant direction of the winds in the northern hemisphere. The large arrow indicates the general direction of the cyclone. Rain is most likely to occur in the front portions of the cyclone and to the right of its route.

water-power is used. Hunting for game in the forests, and quarrying for granite, slate, and marble are also important. In the other States the chief industries are manufacturing cotton goods, woollens, iron wares, and boots and shoes ; while Providence in Rhode Island specialize in jewellery.

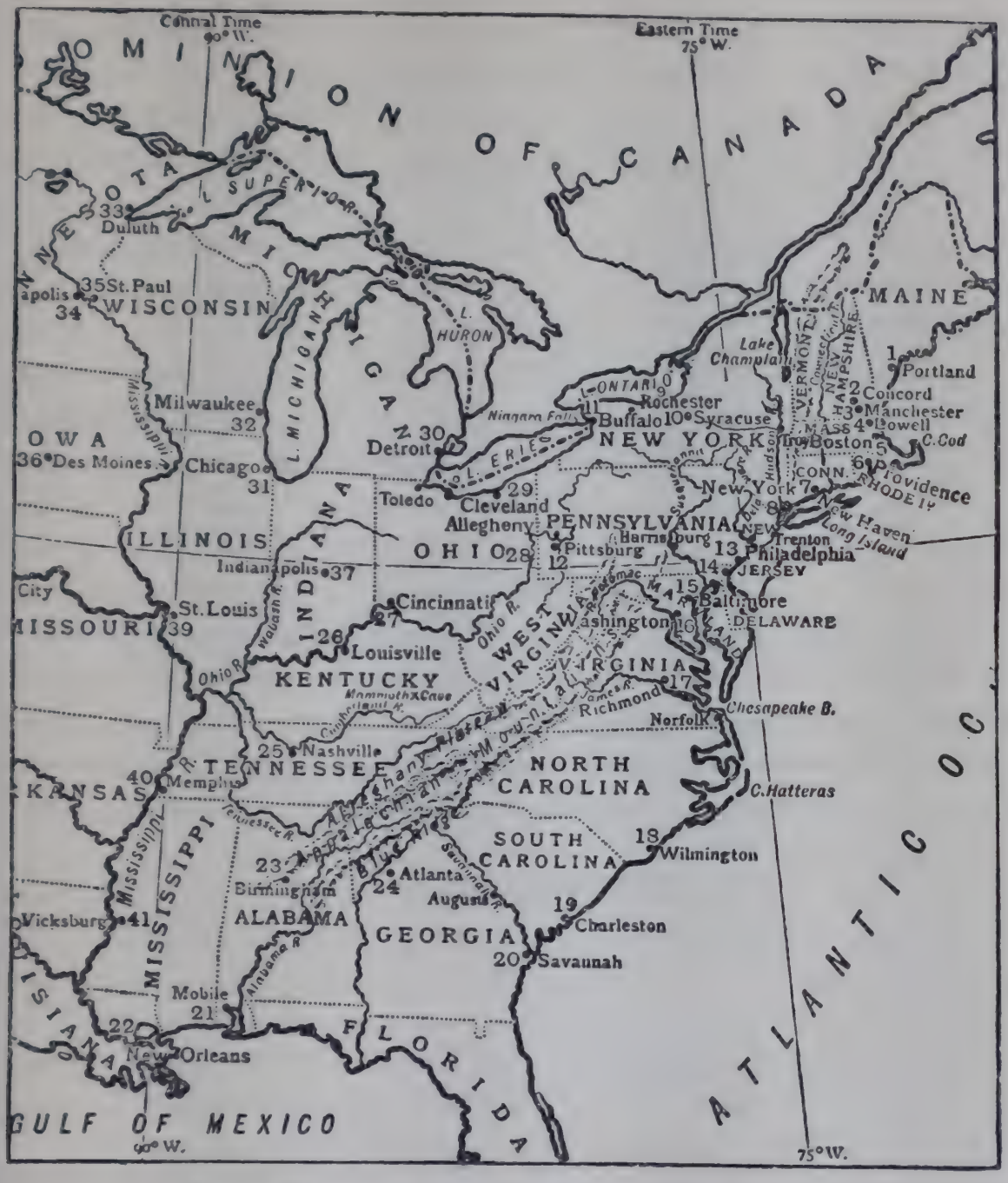
The Cotton Industry here benefits by the damp climate, and by the skill which workers have acquired through long practice. There are also large markets at hand for the goods, and every facility for distributing and exporting them. In some places water-power is used in the factories, but coal is taking its place, and this has to be brought from further south-west. Recently these States have felt the competition of cotton-manufacturing towns in the south, where the cotton plantations are situated, as here the raw cotton has to be imported. The chief centres of the industry are Lowell and Fall River in Massachusetts.

Boston manufactures clothing and boots and refines sugar. It is the second port in the United States, exporting much of the grain and meat from the interior. It is also a great centre for education and art, while the neighbourhood is associated with such famous American writers as Emerson, Lowell, Longfellow, and Whittier. Some fishing is carried on at this port, as well as at **Portland** in Maine. The latter place is the eastern terminus of the Grand Trunk Railway, the chief line of which crosses the St. Lawrence at Montreal, and traverses the Lake Peninsula.

THE HUDSON VALLEY.

The **Hudson** owes its name to the explorer Henry Hudson, who first sailed up it in command of a Dutch ship. The name of the tributary of the Hudson, the **Mohawk,** recalls the days when a tribe of Iroquois Indians of that name lived in its valley, and guarded it as the eastern gateway to the district further west called the ' Long House,' where dwelt four other Iroquois tribes. These four tribes, with the Mohawks, formed the Confederacy of the Five Nations, and on account of their prowess in war were the terror of the early settlers.

The Hudson is navigable to its junction with the Mohawk, while its upper course has been deepened and connected by canal with Lake Champlain. The Mohawk was only navigable for canoes, so the **Erie**

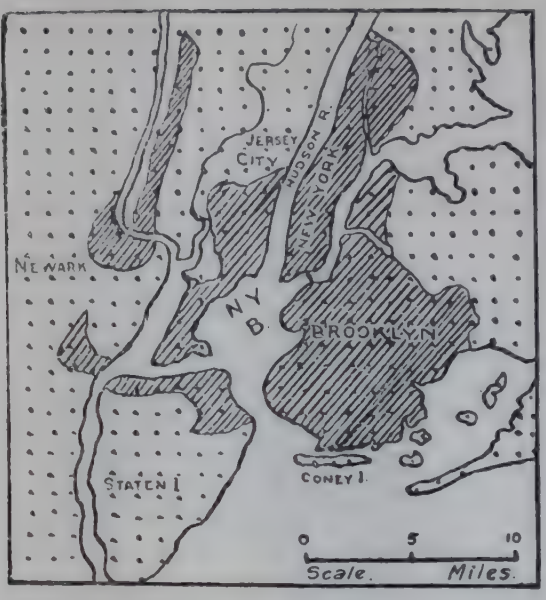


EASTERN UNITED STATES: PHYSICAL AND POLITICAL.

Canal was made along its valley, and unites the Hudson to Lake Erie at Buffalo. This route is followed by six railway-lines, a fact which bears witness to its importance as a commercial highway.

New York, situated on Manhattan Island, at the mouth of this important route from the interior via the Mohawk and Hudson Valleys, is the largest city in the United States, and the second largest in the world. It has an excellent harbour, and miles of wharves along the shores of the Manhattan Island and Long Island, on which latter stands Brooklyn, connected with New York by a suspension bridge, and muni-

cipally included in it. There are other suburbs on the west bank of the Hudson and on Staten Island, for Manhattan Island has long proved too small for the population, despite the very high houses that have been erected. The chief manufacture in the city is clothing, but many other industries exist, and there is a large publishing trade.



ENVIRONS OF NEW YORK.

The Hudson and Mohawk Valleys are lined throughout their length with a chain of towns and villages, for four-fifths of the population of the 'Empire State' of New York is concentrated here. The town of **Albany** lies near the confluence of the Mohawk and the Hudson, and is noted for iron manufactures; while **Rochester** benefits not only by the traffic along the Mohawk route, but by falls on a small river flowing into Lake Ontario, which aid its flour-mills. Clothing is also manufactured here.

THE SOUTHERN APPALACHIANS.

These form an upland, composed chiefly of crystalline rock, which is sometimes known as the Blue Ridge in the south-east. Towards the west the region consists of a series of ranges running north-east and south-west, separated by longitudinal valleys. Still further west lies the Alleghany Plateau. The district was formerly heavily forested, and, were it not for the few rivers which breach it, would have been an even more serious barrier to expansion westwards than it has proved. In the northern portion the valleys of the Delaware, with its tributary, the Schuylkill, the Susquehanna, and the Potomac, have, therefore, a great commercial importance, and have enhanced the value of sites at their mouths.

Towns.—Philadelphia stands on the Schuylkill at its confluence with the Delaware, benefiting by the water-power from the falls which occur here. It is also at the head of ocean navigation, and thus a great port as well as an industrial city, manufacturing clothing, woollens, carpets, iron goods, and refining sugar. It was founded in Charles II.'s reign by William Penn, after whom the State Pennsylvania

—*i.e.*, Penn's Wood—is named. **Baltimore** stands at the head of Chesapeake Bay, which is very noted for oysters. A good deal of grain and meat goes out from this port, and the manufacture of clothing is important. **Washington,** the political capital of the United States, is situated at the head of the Potomac estuary, but it is not a manufacturing town and only a minor seaport. The city is entirely devoted to governmental business, and has many magnificent buildings, including the Capitol in the centre, where Congress is held, and the White House, the official residence of the President.

Birmingham, situated in Alabama, at the southern extremity of the Appalachian belt, has developed a great iron industry on account of the coal and iron found in the locality.

THE ALLEGHANY PLATEAU.

This plateau has a steep front towards the valleys of the Appalachians and a gradual slope to the prairies, while it is much dissected in parts by the gorges through which the tributaries of the Ohio cross it. One of the most important of these tributaries is the Cumberland, which gives its name to the southern portion of the plateau, and to the gap it has cut where it enters the plateau at the junction of the three States, Virginia, Kentucky, and Tennessee. The soil of the plateau is fertile, and in parts of Tennessee and Kentucky there grows the rich 'blue grass' on which many herds of cattle are reared.

Minerals.—The prevailing rocks of the plateau consist of sandstone, limestone, and coal-measures. In some places the limestone is so porous that water has sunk through it and dissolved out vast subterranean channels, the most famous being the Mammoth Cave in Central Kentucky. The chief coal-fields of the United States occur in Pennsylvania, where iron is also mined. There, too, petroleum occurs, and natural gas issues from the ground, and is conveyed to Pittsburg for manufacturing purposes (see p. 333).

Pittsburg occupies an important position at the junction of two navigable streams, which unite to form the Ohio. River steamers can reach the town, and it enjoys excellent railway communication with Philadelphia on the coast, Cincinnati on the Ohio, and Cleveland on Lake Erie. It is to the last place that the iron found around the western end of Lake Superior is largely sent, both for factories there and to be forwarded to Pittsburg for manufacture, since the supplies found round

Pittsburg are now insufficient. Pittsburg has also the largest glass industry in the States, for natural gas is the best fuel for this. **Alleghany,** its close neighbour, manufactures iron and leather.

THE ATLANTIC COASTAL PLAIN.

This plain ages ago extended all along the eastern coast of the United States, but submergence has reduced it in the north to the existing peninsulas and islands, and has converted the estuaries of the rivers into deep inlets. The towns in this northern portion have been already described (see pp. 208 to 211).

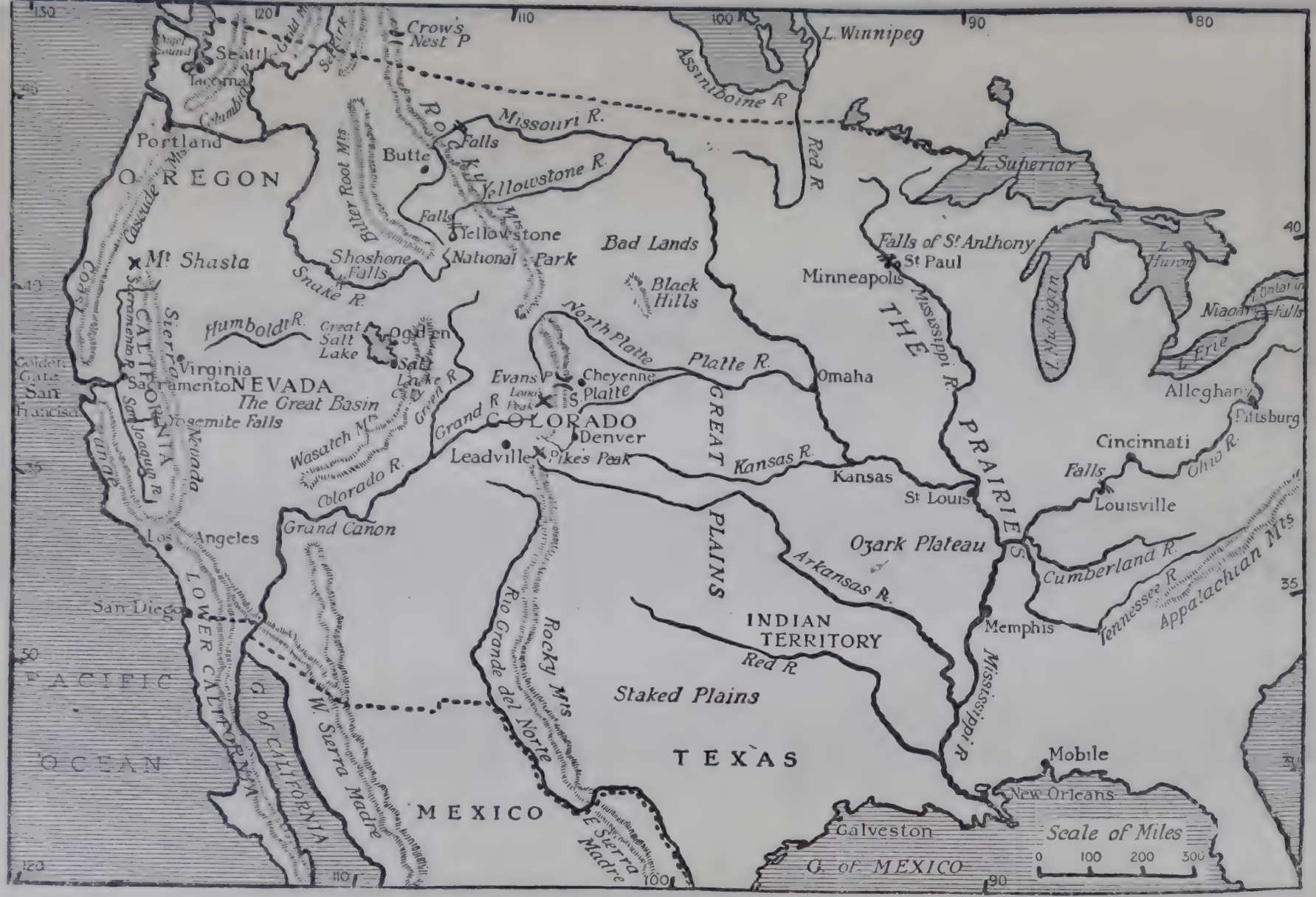
South of Chesapeake Bay the plain attains considerable width, and is crossed by several rivers, which rise in the Appalachians. The coast is fringed with sandbanks and islands, behind which are many shallow lagoons and marshes. Cape Hatteras stands at the meeting-place of two series of islands formed by currents.

Productions.—A great deal of tobacco is grown in Virginia, and is manufactured at **Richmond,** which has grown up at the head of important navigation on the James River. Further south, in the Carolinas and Georgia, the chief productions are rice; in the coastal marshes timber, tar, and turpentine from the pine-forests on sandy tracts, and cotton in fertile parts on the mainland, and on some of the islands along the coast. The variety grown on these islands, and known as Sea Island cotton, is of special value on account of the length of its fibre. Cotton goods are now manufactured in several towns in the Carolinas and Georgia—notably at **Augusta,** which stands on the Savannah, where water-power is available. Much of the cotton is exported from the ports of **Charleston** and **Savannah.**

Florida.—The southern portion of this peninsula is a marshy wilderness. The high temperature of the State has enabled pineapples and early vegetables to be grown very successfully, though occasionally a severe spell of cold has ruined the fruit. The islands to the south are of coral formation, and on one of these is the naval station **Key West.**

THE PRAIRIES AND GULF PLAIN.

The Mississippi, which crosses this region and flows into the Gulf of Mexico, is over 2,000 miles long. It is navigable nearly to its source, while its great tributary, the Missouri, is navigable to the base of the Rockies. Of the other tributaries of the Mississippi, the Ohio



CENTRAL AND WESTERN UNITED STATES: PHYSICAL AND POLITICAL.

and Tennessee, and the lower portions of the Arkansas and Red Rivers are navigable, but the Platte and Kansas, tributaries of the Missouri, are not used to any extent. The flatness of the land crossed by the Mississippi has caused the river to wind considerably, especially in its lower course. Curved lakes are also numerous along its banks, and are the remnants of old bends that have been left by the river at various former periods, when it has adopted a more direct course, and cut through the neck of a loop. These lakes are sometimes called ' cut-offs.' The river brings down so much sediment as not only to build the vast delta at its mouth, but also to raise its bed above the level of the land in its lower course, so that banks of earth (called levees) have had to be raised to protect the country from floods.

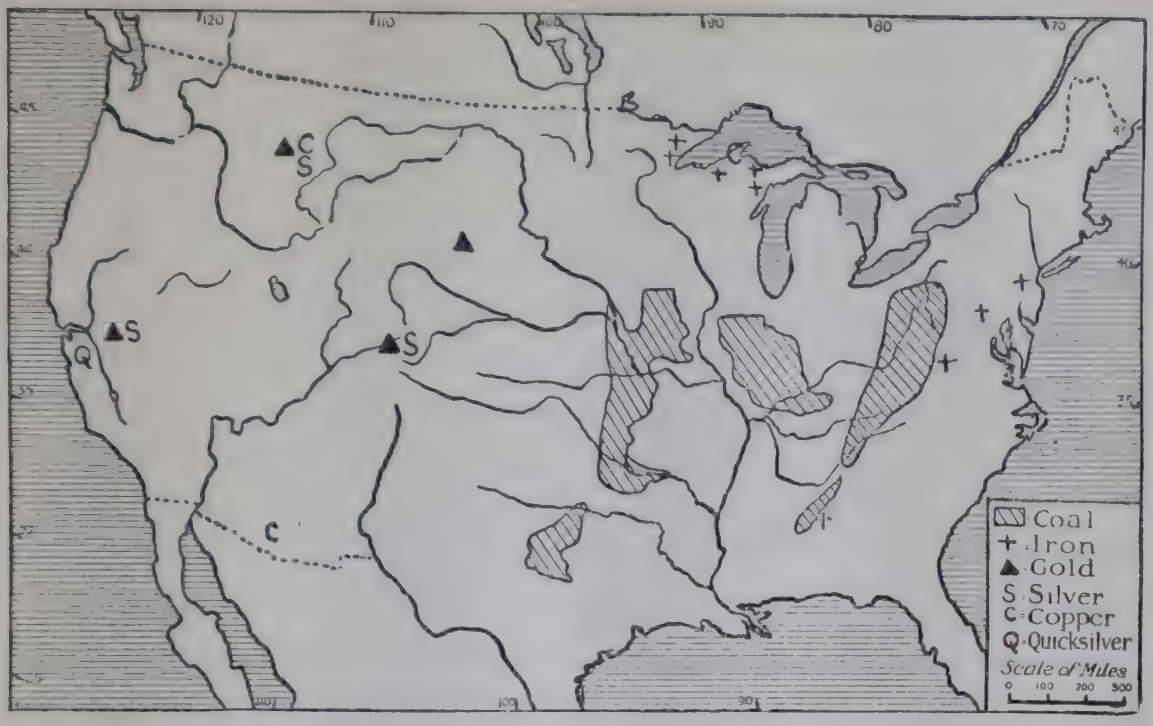
The States around the Great Lakes and in the basins of the Mississippi, to about longitude 100° west, are extremely fertile. Timber, especially white pine, is procured from the Lake States, but elsewhere large forests are absent, though the rivers are often fringed with trees. The open nature of the country has favoured its rapid agricultural development, and facilitated the construction of a network of railways over it.

The **chief crops** are wheat, oats, and barley in the north ; wheat especially in the basin of the Red River ; maize further south ; tobacco in Kentucky ; cotton in the valley of the Lower Mississippi on the low districts known as the ' Mississippi Bottoms,' as well as in Texas ; and rice in the coastal swamps of Louisiana (see pp. 326, 328 and 330).

Animal Productions.—The maize is largely used for rearing hogs, so that pork, bacon, and hams are important products of the Central States. Cattle and sheep are reared in vast numbers on the grasslands towards the west, but the best dairy cattle come from the richer pastures round the Great Lakes (see p. 332). Fishing for whitefish, lake trout, and sturgeon is important on all the lakes save Lake Ontario.

Minerals.—Coal is found in Illinois between Chicago and St. Louis, and in the basin of the Ohio. Extremely rich deposits of iron occur round the western end of Lake Superior, and of copper in the peninsula that juts out from the southern shore of that lake (see p. 333).

Towns on the Great Lakes. — The commerce carried on across the Great Lakes on account of the wealth of the lands around them is enormous, and many large towns have arisen on their shores. **Buffalo** stands at the eastern end of Lake Erie and the exit of the Erie Canal. A railway here crosses the Niagara River from Canada



THE UNITED STATES: DISTRIBUTION OF MINERALS.

into the United States. The city derives electrical power from Niagara Falls for some of its factories. **Cleveland,** on Lake Erie, is noted for iron goods, while **Detroit,** at the western end, smelts copper. Detroit is also another crossing-place from Canada to the States, the trains being taken over by ferry. **Duluth** is a great grain port at the western end of Lake Superior, and Chicago stands near the head of Lake Michigan.

Chicago is now the second largest city in the United States, having grown at a phenomenal rate. Its site was determined by a small river which discharges into the lake there, and has been deepened to create a good harbour. Its chief advantage lies in the fact that railways from the north-west are obliged to pass through it in rounding Lake Michigan to reach the Atlantic, while it also forms a good centre for railways from the south. It can, therefore, easily collect such products as coal, iron, timber, cattle, hogs and grain, while the abundance of these resources has made it a great centre of trade, and has led to industries for the production of pork, canned meat, furniture, leather, iron goods, etc.

Towns in the Mississippi Basin.—Minneapolis stands on the Mississippi where the Falls of St. Anthony occur, and furnish water-power for its flour mills. Steamers of considerable size can reach the city. **St. Louis,** which stands near the confluence of

the Missouri and Mississippi, benefits by its central position and power of despatching products, either southwards to the Gulf ports or eastwards to the Atlantic, as circumstances render advisable. Here the Mississippi is crossed by a railway-bridge ; and the town is a great railway centre, besides possessing flour-milling, meat-packing, and iron industries. The towns on the Lower Missouri—as **Omaha** near the confluence of the Platte, and **Kansas** at the junction of the Kansas—are important cattle and meat markets on account of the live-stock reared in the district.

On the Ohio below Pittsburg stand the large towns of Cincinnati and Louisville. **Cincinnati** is situated at the north of the marked bend in the Ohio, and has several pork-packing establishments. **Louisville** stands where rapids on the river afford water-power, though a canal has had to be made to avoid the obstruction they offer to navigation. The town is particularly noted for its tobacco trade, the plant being largely cultivated on the fertile limestone in Kentucky. Cattle from this blue-grass district also make it a live-stock market.

The **Gulf Ports** are New Orleans, Mobile, and Galveston. **New Orleans,** on the delta of the Mississippi, can now be reached by large vessels through one of the channels (called ' passes ') which traverse the delta, but the site of the town is low and unhealthy. Its enormous trade, especially in cotton, is due to its central position on a coast where rivals are few, and to its good rail and water communication with the productive regions behind it.

Large vessels can also reach **Galveston** in Texas, which has been made the chief Gulf port of the Southern Pacific Railway, but the harbour of **Mobile** is not deep enough for the largest vessels.

THE GREAT PLAINS.

The **Great Plains,** which stretch to the base of the Rockies, would perhaps be better described as plateaus which rise gradually westwards in a series of broad swells, and are diversified by the deep valleys of the rivers which cross them. Great extremes of temperature are experienced, and the rainfall is everywhere too slight for agriculture unaided by irrigation. Most of the region is covered with grass and devoted to sheep and cattle rearing, and as the snowfall is slight, the cattle can remain out all the year round.

Parts of the Great Plains have been set aside as **Reservations for the native Indians,** where they can live under their own

form of tribal government within certain limitations. The United States Government supplies them with food and clothing, but they are not allowed to leave the districts without permission, nor are other races allowed to settle therein. The '**Indian Territory,**' on the other hand, is a district which, though originally intended for some Indians, who were removed thither after the war about 1830, is now mainly peopled by white settlers, and has also a large negro population.

The chief town in the Great Plains is **Denver** in Colorado, which is now a junction of many railways. It has large iron-works and smelting furnaces for the gold and silver mined in Colorado.

THE WESTERN HIGHLANDS.

The **Rocky Mountains,** which bound this area on the east, consist of many distinct ranges, the general direction of which is north and south, and which enclose small tracts of level land called 'basins' or 'parks.' One of these basins, in which the Yellowstone tributary of the Mississippi rises, is now preserved as a **National Park** on account of its wonderful **geysers.** These are jets of steam and hot water which suddenly issue from certain holes in the earth, and often shoot up into the air to a height of 100 to 200 feet. The action is intermittent, since some time must elapse between the explosions to allow of a fresh supply of water entering the shaft and being heated. When the water at the lower end of the shaft has become so hot as to turn into steam, an explosion takes place, and the column of water above it is thrown up into the air. The hot water in passing through the earth dissolves out silica and other minerals, which are deposited around the geysers and hot springs, forming curious rocky incrustations. The Yellowstone forms magnificent falls in its course through the park and passes through picturesque gorges called cañons.

Minerals.—The Rockies are noted for their mineral wealth, and the chief towns here are mining centres. Besides coal, mainly lignitic in character, which occurs in various scattered areas, and is as yet little worked, there are valuable deposits of copper, lead, silver, and gold. The chief supplies of copper come from **Butte,** which is also noted for silver and gold; but the most important deposits of silver and gold are in Colorado, round **Leadville,** where lead is also mined (see p. 334).

The **western plateaus** are crossed by the Columbia River, with its tributary the Snake in the north, and the Colorado in the south,

while between these lies the area of inland drainage known as the Great Basin. Population on these plateaus must ever be slight, on account of the dry climate, though sufficient grass exists in some parts for sheep and cattle, and agriculture is possible when water can be obtained for drinking and irrigation purposes.

The Great Basin is in reality a collection of basins, for between the Wasatch Mountains, which bound it on the east, and the Sierra Nevada on the west, it is crossed by numberless short ranges, subdividing it into many depressions. Some of these are dry, while others are watered by streams of uncertain volume, which here and there terminate in swamps and salt lakes. The largest lake is Great Salt Lake, on the shores of which **Salt Lake City** was founded, in the middle of the nineteenth century, by a party of settlers holding peculiar religious beliefs and called Mormons. The city grew quickly through the careful irrigation works made by the inhabitants in the neighbourhood. There are some mining towns in the Great Basin, for silver is found in Nevada.

The Colorado Plateau is trenched by the wonderful cañons of the Colorado and its tributaries. The layers of rock here are nearly horizontal, but vary in degree of hardness and in colour, so that the cañon walls have a terraced appearance, the harder strata forming steep precipices and the softer ones more gradual slopes ; while the alternation of the shades of red, brown, buff, and grey which they present adds to the grandeur of the scene. In a few places the cañons are even a mile in depth, and the whole plateau is cut up by them into gigantic rocky fragments, all destitute of vegetation on account of scanty rainfall. It is the absence of vegetation that enables the rivers to carry away so much soil and cut such deep channels, for there is nothing to bind the loose pieces of rock together. These, therefore, are easily washed away, and as they are whirled along become tools which erode the banks still further. The Colorado chiefly derives its water-supply from the snows and rains on the mountains near its source. The river, on account of many rapids, and the difficulties of reaching it from the plateau above, is of slight commercial value ; while the cañons render communication between the different parts of the plateau very difficult.

The **Pacific ranges** benefit by the moisture-laden winds from the south-west, especially in winter, and as a result the climate does not suffer from extremes, and the slopes of the Cascades and Sierra

Nevada are thickly clad with forests. The excess of moisture promotes the snows on the Sierra Nevada, which help to swell numerous streams flowing westwards into the rivers that find an exit by the Golden Gate of San Francisco.

The Californian Valley. — These streams are valuable for irrigation in the Californian valley, where the summers are dry and the winter rainfall is scanty and partly cut off by the Coast Range. The streams also help to bring down the soil which has converted the valley into such a productive area. Many are noted for their beauty. Of these, the most famous flows through the Yosemite valley, descending in places by a series of magnificent waterfalls. The Sierra Nevada range is noted for gold and the district south of San Francisco for quicksilver (see p. 334). It was the discovery of the gold that led to the development of the Californian valley, for mining did not long afford employment for all who came, and the rest saw the agricultural advantages of the district, and became farmers and fruit-growers. Much of the land is now devoted to producing wheat, grapes, oranges, prunes, peaches, apples, pears, and many other fruits. These products can be sent away by rail as well as by sea, for lines have entered the valley at the north, south, and east, and form a great railway junction at Sacramento. **San Francisco,** the natural outlet of this rich valley, has a magnificent harbour, and benefits by the absence of any near rivals. Many steamer-lines converge on this port, and its connection with Asia is shown by the large quarter of Chinese residents to be found in the town.

Next to the Californian valley the most important part of the Pacific coast lies around Puget Sound and the mouth of the Columbia. Here wheat and timber are the chief products, and are exported from Portland in Oregon, which is the terminus of the Northern Pacific Railroad and other towns. In South California the chief port is San Diego.

COMMERCE.

On account of the vast natural resources of the United States and its numerous manufactures, its internal and foreign trade is enormous. The fact, too, that the country has ports both on the Atlantic facing the great markets of Europe and on the Pacific opposite the highly productive and densely populated parts of Asia, has increased its trade.

It has, moreover, great facilities for the transportation of goods, and is now crossed by the following four great lines: (1) The Great

Northern, between Duluth on Lake Superior and Seattle ; (2) the Northern Pacific, between Duluth and Portland, Oregon ; (3) the Union and Central Pacific, now part of the Southern Pacific system, between San Francisco and Omaha, with connections to Chicago and New York ; (4) the Southern Pacific, between San Francisco or San Diego and New Orleans. Besides these there is a close network of lines over the Atlantic and Prairie States ; while the flat nature of much of the land, and the abundance of coal and iron, have enabled these to be laid and maintained at so cheap a rate that the freight charges are remarkably low. The St. Lawrence, Mississippi, and Hudson rivers, combined with the Great Lakes and Erie Canal, also carry much traffic, in spite of railway competition. For the Panama Canal scheme see p. 222.

The chief exports from the United States are raw cotton—of far the most value—iron and steel manufactures, breadstuffs, meat, and dairy produce, mineral oils, copper and copper goods, wood and manufactures of wood, leather and leather goods, and coal. Four of the chief imports are hides, sugar, indiarubber, and raw and manufactured silk.

Foreign Possessions.—The United States purchased Alaska from Russia in 1867. They also possess the Philippines in the East Indies, the Hawaiian Isles in the North Pacific, and Puerto Rico in the West Indies, besides exercising a suzerainty over Cuba.

MEXICO AND CENTRAL AMERICA.

This area consists of the following natural regions: (1) The coastal lowlands and mountain slopes under 2,000 feet high ; (2) the higher slopes and plateau of the interior ; (3) the mountainous peninsula of California, which on account of the arid nature of the climate is of slight commercial importance. The climate of Mexico varies with the altitude.

The Lowlands.—While the west coast of Mexico and Central America is fairly high and rocky, the east is everywhere low, and in parts fringed with shallow lagoons and sand-bars, or with mangrove swamps. These swamps are the breeding-places of mosquitoes, which have added to the difficulties of developing these districts. The climate, too, is most unhealthy, being intensely hot and very moist along the east coast. Both the coastal plains and the lower slopes of the ranges behind are thickly forested, yielding rubber, coco-nuts, mahogany, rosewood, ebony,

and logwood, from which last certain dyes are produced. Among the cultivated products are cacao, sugar, cotton, vanilla in Mexico, and such tropical fruits as bananas and pineapples. Most of the bananas we import from America come from Costa Rica and Jamaica.

Although **cacao** is produced here, the trees do best still nearer the Equator, for they require much heat. They also, however, need shelter from the direct rays of the sun, and so are cultivated under the shade of other trees. It takes about twelve years for cacao-trees to come into full bearing, and then they continue to yield good returns for about thirty years. The cacao beans are the seeds of its fleshy fruit, which have to be extracted and dried in the sun before they are ready for export. They have also to be roasted and ground to make cocoa and chocolate. Chocolate and other confectionery are sometimes flavoured with **vanilla,** which is obtained from the pod of the vanilla plant. This is a sort of twining orchid, and one plant on an average produces about twenty pods, or 'beans,' as they are sometimes called. In the peninsula of Yucatan a species of agave is widely cultivated, on account of the fibre called **henequen,** or sisal-hemp, which is derived from its thick leaves ; but most of the peninsula is covered with forests.

Settlement in the Mexican lowlands is confined to the ports, which are most numerous along the east coast, in spite of its unfavourable climate, because the chief trade is with European countries and the eastern side of the United States. **Vera Cruz** is the chief port of Mexico, and large ocean vessels can enter the harbour. Farther north is the port of Tampico, which, though not so deep as Vera Cruz, is more healthy.

The Mexican Plateau is bordered by the East and West Sierra Madre, and bounded on the south by a volcanic range running east and west, which includes Orizaba among its numerous high peaks. The climate on the top of the plateau is rather dry, since the rain is partly cut off by the bordering ranges, and the temperature is much reduced by the altitude. Maize, beans, wheat, and barley do well wherever there is adequate moisture, while cattle are largely reared in the north. Many varieties of cacti occur, and on one species the cochineal insects, which yield a crimson dye, are reared. Pines and various deciduous trees grow in parts of the plateau, and on its upper seaward slopes, which are well supplied with moisture. These hardy trees merge gradually into the tropical forests as descent is made to the lowland, and, in the zone between 3,000 to 6,000 feet high, coffee and tobacco are cultivated. Coffee does

CENTRAL AMERICA AND THE WEST INDIES: POLITICAL.

best in Costa Rica, and tobacco in Eastern Honduras ; but both are grown in Mexico. Mexico is also noted for its mineral wealth, particularly silver and gold (see p. 334). Iron, copper, and sulphur are also worked.

The inhabitants of the country are partly of European (mainly Spanish) descent, partly native Indians, and partly a mixed race known as native Mexicans. **Mexico,** the capital of the Republic, is a fine city, with a cathedral, and has become the centre of an extensive railway system. Lines have been laid down connecting it with ports on both oceans and with the United States to the north. Another line traverses the isthmus of Tehuantepec.

The most valuable **exports** from Mexico are silver and gold, others being copper, heneguen, coffee, hides, lead, tobacco, and timber.

In the **Central States** population is generally densest on the higher and healthiest parts of the interior, and here are situated New Guatemala, capital of Guatemala ; Tegucigalpa, capital of Honduras ; San Salvador, capital of Salvador ; and San José, capital of Costa Rica. Belize, the capital of British Honduras, and Panama, capital of the State of that name, are, however, ports ; while Managua, capital of Nicaragua, lies fairly low on the shores of Lake Managua, north of Lake Nicaragua.

The **Panama Canal** is now being built between Panama and Colon—a route already traversed by a railway. It is being made under the auspices of the Government of the United States, which has pur-

chased the land for 5 miles on each side of the canal. The canal will be about 45 miles long, and involves a very deep cutting for at least seven of these miles. One great difficulty is the liability to sudden floods caused by the very heavy rainfall, which has necessitated the building of high embankments in places. The district is also unhealthy, though much has been done to reduce the risk of fever. The canal will shorten the distance between New York and San Francisco by about 9,000 miles by sea, and will lessen very considerably the distance between Western Europe and Western America, and between the northern and middle parts of Eastern America and Eastern Asia. It will also slightly shorten the distance between Europe and New Zealand, but it will not lessen that between Europe and Asia or Europe and Australia. The United States will benefit most by the canal, though, like the Suez, it will be open to ships of all nations on payment of a toll.

THE WEST INDIES.

Relief.—These islands rise from deep water, and separate the Caribbean Sea from the Atlantic. The islands are divided into the Greater and Lesser Antilles, the former comprising Cuba, Jamaica, Haiti and Puerto or Porto Rico, and the latter the chain of smaller isles to the east. All the islands are mountainous, and their shapes often clearly show the direction of the partly submerged ranges. Cuba, for example, has one range, which forms its backbone, and another running east and west at its southern extremity. Haiti has two ranges in the west, which converge towards the east, the northern one apparently continuing the backbone range of Cuba and the southern one the Blue Hills of Jamaica. Of the Lesser Antilles, Trinidad, Barbados, and the other eastern isles are mainly composed of limestone, while the western ones are volcanic. Some of the volcanoes are active, and in 1902 a terrible eruption in Martinique destroyed the chief town and killed a large proportion of the inhabitants.

Climate and Productions.—The climate of the West Indies is hot, though tempered in parts by altitude and by the north-east trade-wind. Most parts, save a few low coastal plains, are healthy, but terrible destruction to life and property is occasionally wrought by hurricanes, which are most frequent in September. The heavy rains in summer,

when the north-east trade-wind is strongest, have promoted a luxuriant vegetation everywhere, and clothed the eastern slopes of the ranges with forests. The many-coloured foliage of these trees adds greatly to the beauty of the islands, which is enhanced by their varied relief, their mountain torrents, and the deep blue background of sea and sky. Some of the trees are of high economic value, yielding mahogany, cedar, and logwood; while coffee, cacao, and such fruits as bananas, oranges, and lemons are cultivated. Limes are also grown in **Montserrat,** where lime-juice is manufactured. The chief crops are cane-sugar, tobacco, maize, pineapples, arrowroot, and various spices, including ginger in Jamaica. The mineral resources of the West Indies are of small value, save for the asphalt or pitch obtained from a lake in **Trinidad.**

Cuba is famous for its production of cane-sugar and for its tobacco. The latter is chiefly cultivated in the western portion of the island, and is manufactured into cigars at **Havana.** This is the chief town, and has an excellent harbour. Cuba is under the suzerainty of the United States, which also governs Puerto Rico, but Haiti is divided between the two independent negro Republics of Haiti and San Domingo.

Jamaica belongs to the United Kingdom. The chief exports from this island are bananas, mahogany, rosewood, sugar, coffee, rum (which is made from sugar), spices, and oranges. The capital of the island, Kingston, suffered severely from an earthquake in January, 1907.

Most of the Lesser Antilles, as well as the Bahamas, also belong to this country. The French own Guadeloupe and Martinique, and Denmark possesses the little island of St. Thomas, which has a fine harbour, but less trade than at one time.

The **Bahamas** stretch between Haiti and Florida, and are formed of limestone secreted by the little coral polyps. These tiny animals resemble sea-anemones, with a deposit of coral at their bases. They can only live in clear warm water, and here the warm Gulf Stream enables them to flourish, as well as still farther north, where they have built up the Bermudas. When the platform of coral created by millions of these polyps comes to the surface of the sea it can be built by their action no higher, as they cannot live out of the water; but its elevation is often raised by blocks of coral rock being broken off by the waves in some places and piled up in others. In time these blocks are reduced to sand, which is bound together by vegetation, and forms a low island. Some of these islands have the shape of a nearly circular reef enclosing a

shallow lagoon, and are called 'Atolls.' Many of the Bahamas are barren, but some are inhabited, and used for growing henequen and pineapples. Other industries are—obtaining salt from sea-water by evaporation in shallow lagoons, sponge-fishing, and catching turtles, from whose shells the so-called 'tortoise-shell' is prepared.

The **Bermudas**, another British possession, are chiefly devoted to growing early vegetables for the New York market—an industry favoured by the very mild climate of these islands.

NORTH AMERICA—REVISION.

RELIEF AND RIVER SYSTEM.

Relief.—North America consists of—(1) The Atlantic Coastal Plain. (2) The Eastern Highlands, which may be subdivided into the Laurentian Highlands and Height of Land, north of the St. Lawrence; and the Appalachian belt and Alleghany Plateau to the south. (3) The middle belt of Lowlands, which extend from the Arctic Ocean to the Gulf of Mexico, but rise slightly about the middle so as to form a water-parting, and also rise westwards towards the Rockies. (4) The Western Highlands.

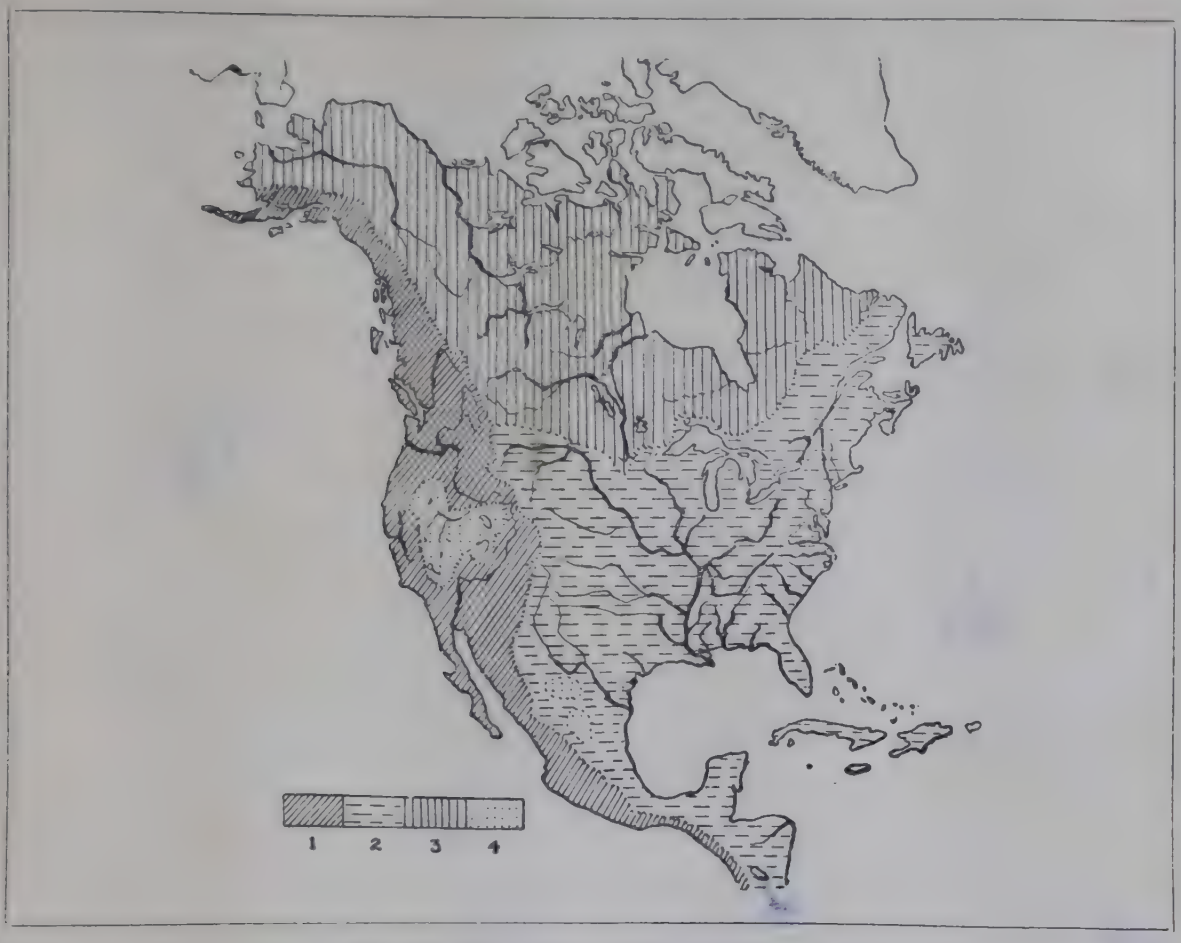
The Western Highlands consist of many plateaus, and of ranges formed by folding of the earth-crust. The eastern edge of the Highlands is flanked by the Rockies, which rise almost precipitously from the Great Plains to a great height, some of the peaks being as high as the most famous Alpine summits. The western edge of this region is bounded by two series of ranges, one a little inland, and consisting of the Alaskan ranges, **Cascade Mountains** (both those in Canada and in the United States), and the **Sierra Nevada**; the other, called the **Coast Range,** in the United States, farther south, traverses the Californian Peninsula, and farther north has been partly submerged. Remnants of it are seen in Vancouver and the other islands fringing the coast; while the submergence has converted the mouths of the rivers which here enter the Pacific into fiords similar to those of Norway. Mexico is bounded on the Pacific side by the western **Sierra Madre**; but this range does not seem to be a direct continuation of any more northerly one. The western highlands really terminate at the Isthmus of Tehuantepec; but east of this begins the Cordillera of Central America, which extends to the eastern end of the Isthmus of Panama. Between the eastern and western ranges mentioned above lie the plateaus crossed by

NORTH AMERICA: GEOLOGICAL.

(1) Plateaus of ancient Archæan rocks. (2) Plateaus of old Primary rocks, and regions of very ancient folding very much altered by long denudation. (3) Plateaus of more recent rocks. (4) Ranges formed by the folding of various rocks in recent times. (5) Lowlands of Primary rocks. (6) High Plains of Secondary rocks. (7) Lowlands of very recent rocks and alluvial formations.

the Fraser and Columbia rivers, the Great Basin, and the plateaus of Colorado and Mexico.

River System.—The rivers can be classified according to the oceans into which they flow and the areas drained to the Arctic, Atlantic, and Pacific Oceans respectively are shown on p. 227. Those which flow to the north have, for climatic reasons, slight commercial value, and those which flow to the Pacific are also little used for navigation, as they suffer from falls and rapids. The St. Lawrence, Missouri, Mississippi, and Hudson are first-class waterways of great value.



NORTH AMERICA: RIVER SYSTEM.

(1) Land drained to the Pacific; (2) to the Atlantic; (3) to the Arctic; (4) areas of inland drainage.

The darker portions of the rivers are the parts which are navigable.

CLIMATE AND VEGETATION.

North America can be divided into the following climatic areas:*

1. **The frigid region** in the north, extending on the east as far south as 55°, though not nearly so far south in the west. Here the intense cold reduces vegetation to mosses, bushes and stunted trees, while Greenland and Baffin Land are barren plateaus capped with ice. Some of the few plants found in these Arctic regions occur also on the high mountains of the western highlands.

2. **The cool temperate regions** south of the above area, where forests predominate. The most common trees are birches, pines, and spruces in the northern and in mountainous parts, and oaks, maples, and other deciduous† trees in warmer districts. In the east the forests extend over most of South-East Canada, and much of the Atlantic coastal plain

* For maps, see pp. 193, 195, 207, 329; and for statistics, p. 343.

† 'Deciduous' is derived from a Latin word meaning falling off, and describes trees which lose their leaves in autumn.

and the Appalachian highlands, because throughout this area there is a fair rainfall at all seasons. In the west they are confined to the mountains, and flourish best on the wet west slopes of the Coastal and Cascade ranges, where some of the trees attain a gigantic height.

3. **The warm, temperate central plains,** where the rainfall occurs chiefly in summer. Here the natural vegetation is grass, and this will probably always predominate towards the west, where the rainfall is inadequate for agriculture. Throughout the rest of the plains pastures are interspersed with cultivated fields; the crops grown vary with the temperature, from wheat, oats, barley, and maize in Canada and the northern States, to tobacco, cotton, and rice in the southern States.

4. **The arid plateaus of the interior.** Vegetation in these parts is naturally scanty, but the sage bush, which is able to survive long droughts, is common in parts, and also various species of cacti, which are able to store up moisture in their great fleshy stems.

5. **The Californian Valley,** characterized by its mild, wet winters, and hot, dry summers. Here, too, the vegetation has to be able to withstand drought, and hence the vine does well, as it can obtain moisture from a great depth by means of its long root, and also oranges and olives, since their thick-skinned leaves prevent the rapid evaporation of moisture. Wheat is cultivated, as it can be sown in autumn so as to benefit by the winter rains, and then be reaped in early summer.

6. **The tropical lowlands,** where great heat and great moisture produce a luxuriant vegetation. Forests predominate, but parts have been cleared for cultivation, some of the typical products being coco-nuts, rubber, coffee, cacao, rice, sugar, tobacco, bananas, pineapples, and other fruits.

FAUNA.

Canada, the United States, and the plateau of Mexico form the zoological province, called the Nearctic; while the rest of North America, the West Indies, and South America form another, called the Neotropical (see p. 331).

The Nearctic Province has a fauna very similar to that of Europe and North Asia, which seems to support the theory that at one time the shallow Bering Straits did not exist, and so animals could pass from the Old World to the New. Different conditions of life in course of time, however, tend to create differences in animals, and this may account

for such peculiarities as distinguish the Nearctic fauna. The native American seals, antelopes, goats, moles, mice, and certain birds are all slightly peculiar, but the bison, which formerly roamed in such large numbers over the American prairies (though now practically extinct), is closely allied to the bison still found in certain parts of the Old World.

The largest wild animals of this region besides the bison are bears (still found in the Rockies), wolves, panthers, lynxes, foxes, moose (known in Europe as elks), and deer; while during historic times most domestic animals have been introduced, as horses, cattle, sheep, pigs, etc.

POPULATION.

The present population of North America reflects in its diverse elements the varied history of the continent in the past, and is composed of the following races:

1. The natives, called '**Red Indians**' on account of the reddish-brown hue of their skin in some cases,* and the mistaken idea of Columbus that he had reached the shores of the Asiatic Indies when he encountered the Bahamas. These are now to be found in any number only in Central America, Mexico, and certain areas reserved for them in the United States and Canada. At the time when America was discovered they were far more numerous, and were to be found in all parts of the continent; but many were killed in wars with the white settlers, and some intermarried with these, giving rise to a large mixed population in the southern parts of the continent. The standard of civilization to which these Indians had attained when Europeans first came into contact with them varied considerably in different parts, some tribes being very backward in this respect, while others, notably those in Mexico and Central America, had made much progress.

2. **Descendants of the original Spanish settlers.** It was not long after the first voyage of Columbus that the Spaniards began to conquer and settle in the West Indies and Central America. Here they met with little resistance from the natives, who were gradually enslaved or destroyed; but the conquest of Mexico by Cortez was a more serious undertaking. The Spaniards intermarried with the natives more than any of the other European settlers in North America.

* The colour of the skin in most cases is said to be more yellow than red, and this, added to the characteristic long lank hair, general absence of beard, and prominent cheek-bones, are suggestive of a Mongolian origin (see p. 189).

3. **Descendants of the early British and French settlers.** During the sixteenth and seventeenth centuries various parties of British colonists settled along the Atlantic coastal plain, the most famous being the band of Puritans called Pilgrim Fathers, who fled from religious persecution in England and landed in Massachusetts in 1620. Little by little these colonists spread westwards, in spite of the Appalachians, till they came into conflict, not only with the natives, but also with the French, who had early explored and colonized the basin of the St. Lawrence, and were spreading southwards into the basin of the Mississippi. Forts at Pittsburg and Quebec were strategically important in guarding the routes into the interior, and it was not till these were captured by the English in 1758 and 1759 that the French were forced to abandon their claims to the Mississippi basin. There is still, however, a large French population in Canada, especially in the province of Quebec.

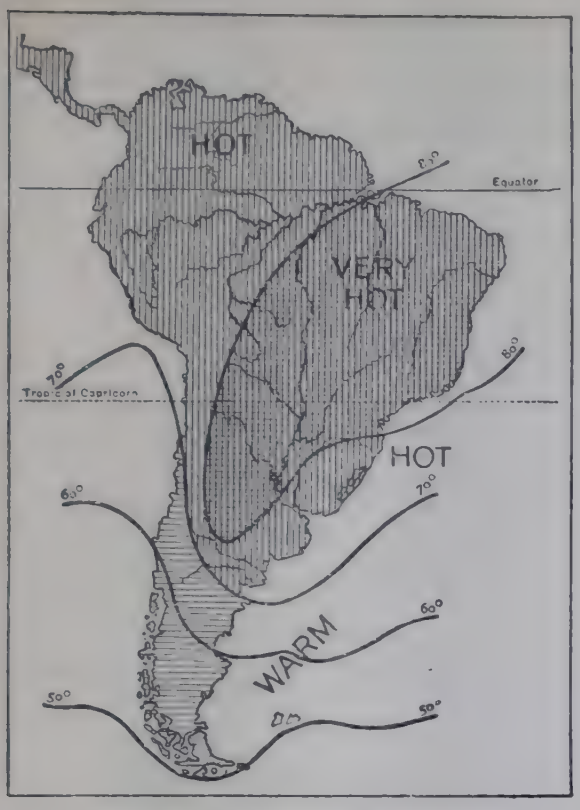
After this war the British settlers in America rapidly increased in number, and were by 1776 powerful enough in the Atlantic States to declare their independence of the British Government. This was the foundation of the Republic of the United States, which rapidly added to the Atlantic States the lands stretching westward to the Pacific.

4. **Descendants of the negroes,** who were imported in large numbers to work as slaves on the plantations in the West Indies and the southern portions of the United States. The Civil War in 1861-1865 brought about the abolition of slavery ; but the position of the negroes in the United States is still one of practical subjection to the predominant white race, from social intercourse with whom they are debarred on account of strong racial prejudice.

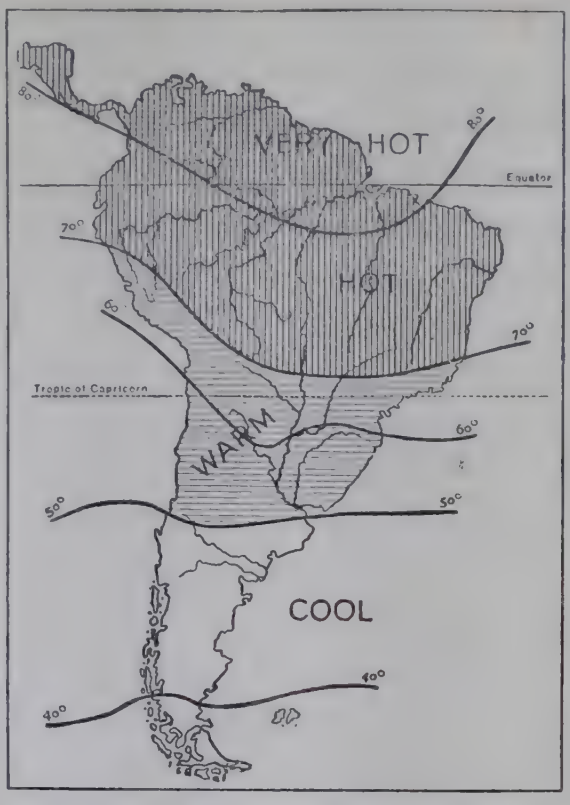
5. **Europeans who have emigrated in recent times,** mainly from the British Isles to Canada, and from Italy, Austria-Hungary, Russia, and the British Isles to the United States. Every year there is a large influx of such immigrants, who settle down and intermarry with the descendants of the earlier settlers.

6. **Some Chinese,** and a few Japanese, have settled at San Francisco and other places in the west.

The distribution of population is shown on the map on p. 335. For statistics, see p. 350.



Mean Isotherms for January.



Mean Isotherms for July.

SOUTH AMERICA.

SOUTH AMERICA.

CONFIGURATION AND POLITICAL DIVISIONS.

SOUTH AMERICA has a compact pear-like shape, and the northern or largest portion lies within the tropics. The continent consists of three elevated regions—namely, the Andes, the Guiana highlands, and the Brazilian highlands—and of three river plains between them. The plain of the Orinoco divides the Guiana uplands from the Andes; that of the Paraguay and Parana separates the Brazilian highlands from the Andes; while the basin of the Amazon lies between the three elevated regions, and is continuous with the other two plains. Thus together the plains form a central belt of lowland, with an eastward extension along the Lower Amazon, nearly half of the total area of the continent being at an elevation of less than 600 feet.

The Republics into which South America is divided may be correlated as follows with this relief: Venezuela consists partly of the plain of the Orinoco, partly of the western Guiana highlands, and partly of the northern Andes. The three Guianas occupy the coastal lowlands north of the Guiana highlands. Brazil includes the larger part of the Amazon

basin and the Brazilian highlands. The States of Paraguay, Uruguay, and northern Argentina occupy the basins of the Lower Paraguay, Parana, and Uruguay ; southern Argentina, or Patagonia, being the slope to the Atlantic south of the Rio de la Plata. The remaining States of Colombia, Ecuador, Peru, Bolivia, and Chile are all parts of the Andean ranges and plateaus.

THE PLAIN OF THE ORINOCO, VENEZUELA.

The **Orinoco** rises in the Guiana highlands, and not far from its source receives a tributary which, by flowing into the Negro tributary of the Amazon, connects these two great rivers. The course of the Orinoco is very curved, and at its mouth there is a great forested delta, crossed by the many channels, or distributaries, into which the river divides. The Orinoco is navigable for 1,000 miles, and crosses the grassy plains known as the **Llanos.** During the dry winter season these plains are like deserts, but after the rains which are brought by the north-east trade-winds, chiefly in summer, numberless cattle are reared here (see p. 241). The monotony of the scene is broken by groups of shrubs and trees, and the region is studded with ponds, to which wild animals and such birds as the heron, stork, and ibis resort in large numbers. The grass often grows to a great height, and terrible fires sometimes occur.

West of the plains of the Orinoco, and separated from it by one of the Andean ranges, lie the lowlands round the Gulf of Venezuela. Here, and on the lower slopes of the ranges, coffee and cacao are grown. These, with cattle and hides, form **the chief exports** from the country.

The capital of Venezuela, **Caracas,** is situated at some height, and lies a short distance inland, but is connected by rail with its port, La Ganyra.

THE GUIANA HIGHLANDS AND STATES.

The scenery of this region is particularly picturesque, but on account of its rugged nature and the cataracts on the rivers it is still but little explored. Those parts best known are where the occurrence of gold has attracted settlers, as on the borders between Venezuela and British Guiana in Southern British Guiana, and between French Guiana and Brazil. Part of the region is densely forested, but large areas in the interior are grassy or barren. The forests are the haunt of tapirs, jaguars, ant-bears, and many monkeys, while bird and insect life is abundant.

SOUTH AMERICA: RIVER SYSTEM.
The darker portions of the rivers show where they are navigable.

SOUTH AMERICA: RELIEF. (After the Diagram Co.)

The Coastal Lowlands.—Here a hot moist climate combined with fertile soil has been found suitable for the cultivation of sugar (notably in British Guiana) and of cacao. Negroes and coolies have been introduced in order to work the plantations, and these form the bulk of the population; while the Europeans who have settled here are mainly British, French, and Dutch, in the respective areas these nations govern. Georgetown, or Demerara, is the capital of British Guiana; Paramaribo that of Dutch Guiana; and Cayenne, which is used as a penal station of the French, that of their territory.

BRAZIL.

1. THE BASIN OF THE AMAZON.

The **Amazon** rises in the Andes, and flows north-west for some distance between parallel ranges before it is able to turn eastwards. Most of the tributaries on the south side—as, for example, the Madeira, the Tapajos, and the Tocantins—are longer than those from the north. It has been already stated that there is a connection between the Negro and the Orinoco, and at times of flood another exists between the Tapajos and the Paraguay. The Amazon is navigable to the base of the Andes—a distance of 3,000 miles—and in depth and breadth is far more like a continuous lake than a river. In its course it often divides and encloses large areas of land, which thus become islands, while its banks are composed of vast forested swamps. The volume of water it conveys to the sea is enormous, and on account of the force of the tide in its great estuary it is generally entered from the sea by the Para Channel, south of the Island of Marajo.

Climate.—Since the basin is traversed by the Equator, the heat is very great at all seasons. The intense heat creates a constant indraught of moisture-laden air from the Atlantic, which is cooled by constantly rising. The tendency of hot air to rise is here also promoted by the high Andes. As the air rises the moisture it contains is condensed, and thus the region has a heavy rainfall (see p. 327). Near the Equator rain falls almost daily, but farther north or south the rainy season depends on the seasonal shifting of the heat belt. A double rainy season occurs in districts twice crossed by this belt.

The Selvas.—The great heat and rainfall of the district have produced the Selvas, almost impenetrable forests, which occupy most of

the Amazon basin. Here giant trees of endless variety rise from the dense undergrowth, and are interlaced by the stems of numerous climbing creepers, and adorned with orchids and other plants which can live on their juices. Though full of reptiles and insects, the forests are little inhabited by larger animals, except for the monkeys. Some of these, known as the howling monkeys, make a dreadful noise at dawn and sunset, but at other times the silence and gloom of the forest are said to be extremely oppressive. The poor and scattered inhabitants dwell in wretched mud hovels, or lead a wandering life, and live by catching fish, turtles, and alligators in the rivers, or collecting forest produce for sale.

Productions.—By far the most important product of the Selvas is **rubber** (see p. 330). In order to obtain the rubber several small gashes are made round the trunk of the tree, and cups are fixed underneath each, into which the milky juice will run. This juice has afterwards to be collected and coagulated over a fire into cakes ready for export. **Manaos,** on the Rio Negro, near its confluence with the Amazon, is a great river-port for rubber, and **Para** is the chief seaport. Other forest products are timber (but little yet exported), Brazil nuts, and various fruits, which are eaten by the natives.

2. THE BRAZILIAN HIGHLANDS.

This region is a diversified area composed of many ranges, plateaus, and valleys. The mountains are highest behind Rio de Janeiro, and the chief valleys are traversed by the São Francisco, the upper Parana, and the Tocantins. Navigation on all these rivers is interrupted at points by falls. The soil is generally poor, and in the interior the temperature is rather low for the latitude. The rain is brought by the south-east trade-winds, and falls chiefly in summer—*i.e.*, November to February. The fall is deficient in the basin of the São Francisco, as the area is cut off from moist winds by ranges near the coast. A park-like mixture of grass and woodland constitutes the prevailing vegetation, the trees predominating towards the north and over the Matto Grosso, or area of the 'Great Woods,' and grasses in the Campos district west of the upper Parana. In some parts cattle are reared; while mining for diamonds and other precious stones is carried on in the upper valley of the São Francisco.

Towns.—The population of Brazil consists of pure and mixed descendants of Europeans and negroes, a small percentage being of native Indian origin. The original settlers were Portuguese, but recent

immigrants are chiefly Italian and German. **Rio de Janeiro** is the capital and chief port of the country. It possesses a magnificent harbour, and is noted for its botanic gardens and fine avenues. It is connected by rail with the mining district already mentioned to the north, and with the noted coffee plantations which are situated on the mountain slopes behind it and mainly to the west (see p. 328). Most of the coffee grown on these plantations is exported at **Santos.** North of Rio de Janeiro are the ports of **Pernambuco** and **Bahia,** which export the cotton, sugar, and tobacco raised on the narrow coastal plain and the lower slopes of the mountains behind.

By far the most valuable **exports** from Brazil are coffee and rubber, others being skins, cocoa, tobacco, and cotton.

THE ARGENTINA, PARAGUAY, AND URUGUAY.

These countries are drained by the Parana, with its tributary the Paraguay, and the Uruguay. Both the Parana and Uruguay flow into the estuary called the Rio de la Plata. The soil along the river valleys is very fertile, and the rainfall which is brought by the south-east trade-wind mainly in summer (November to February) is sufficient for agriculture in the eastern districts. The temperature, though it decreases towards the south, is warmer than might be expected, as the wind reaches the coast across the warm Brazil current.

Productions.—In the sparsely populated republic of Paraguay the chief exports are oranges and maté, the leaf of a species of ilex, which is used to make a beverage like tea. Farther south, between the Parana and the Uruguay, are the best lands in the Argentine Republic for wheat, maize, and flax, this last grown for the seed (linseed), and not for the fibre. West of the Paraguay are the open woods of the Gran Chaco ; and still farther west irrigation is necessary for agriculture, the chief crops being sugar, tobacco, and the vine.

The Pampas.—Throughout central Argentina and Uruguay the prevailing vegetation is grass, affording pasture for innumerable herds of cattle and sheep. This area is called the Pampas, but its aspect is not everywhere quite the same. In some of the eastern districts the tall grass is much mixed with clover, and with thistles, which necessitate special machinery in cleaning the wool of the sheep ; while towards the west the plain is dotted with shrubs. Though over large areas the grass seems to have prevented other plants from growing, there are patches

South America: Physical and Political.

rendered beautiful by scarlet and purple verbena, and many varieties of polyanthus and lilies, as well as by tall clumps of the feathery Pampas grass. The chief inhabitants of the Pampas were formerly the Gauchos—men generally of mixed Spanish and Indian descent, who spent most of their lives on horseback tending the vast herds of cattle and sheep. Now, however, the land is being rapidly fenced, so that a more settled type of life is possible, and modern immigrants are taking their place. These have chiefly come in recent times from Italy, Spain, France, and Germany, and have settled in towns and farms along the rivers and railways, or on the shores of the Rio de la Plata.

Towns.—Asuncion, the capital of Paraguay, is at the confluence of the Pilcomayo and Paraguay; while **Rosario** is a seaport on the Parana and a great railway centre. On the estuary stands **Buenos Aires,** the capital and chief seaport of Argentina. It has a population of upwards of a million, and is the largest town in South America. Railways radiate inland from it in all directions, one of which, after ascending 10,000 feet, pierces the Andes near the Uspallata Pass, and descends to Valparaiso, in Chile. **The chief exports** from Argentina are agricultural products—*i.e.*, maize, wheat, and some linseed; and animals and their products—*i.e.*, mutton, beef, wool, tallow, cattle, butter, skins.

Uruguay.—The towns on the Uruguay—namely, Paysandu and Fray Bentos—are occupied in slaughtering cattle and making meat extracts. They are accessible by sea-going vessels, but the capital and chief port of the State of Uruguay is **Montevideo.**

Patagonia, which forms the southern portion of Argentina, is a low and generally stony plateau. The climate is cool and dry, for the region is too far south to be reached by the south-east trade-wind, and is cut off by the Andes from the westerly winds. There are, however, sufficient patches to support flocks of rheas and guanacos, which are hunted for food by the natives. The guanaco, like the llama, resembles a small camel, and its skin is used by the Indians for clothing and to cover their tents.

South of Patagonia lies the island of **Tierra del Fuego,** which is politically divided between Argentina and Chile by a line running north and south, so that both sides of the Straits of Magellan belong to Chile. East of the straits are the **Falkland Isles,** which belong to Britain, and are devoted to sheep-rearing. The climate here is cold and damp, and the prevalent high winds have prevented the growth of trees.

THE NORTHERN ANDEAN REGION, COLOMBIA, AND ECUADOR.

Relief.—Several ranges converge in this region to a point north of Quito, and then enclose the high plateau of that name. These flanking ranges contain the lofty volcanoes of Chimborazo and Cotopaxi. The Andean system is separated by a deep valley from the range that traverses the Isthmus of Panama. The Magdalena River, which flows northwards through Colombia, is navigable, but has an obstructive bar at the mouth.

Climate and Productions.—The rainfall on the lowlands and mountain slopes is heavy, but temperature varies with altitude, and so does vegetation. The district round the Gulf of Guayaquil in Ecuador is particularly suited for cacao, while coffee is the staple crop on the slopes of ranges in Colombia (see p. 328). The forests in these countries yield rubber, and the bark of the cinchona-tree from which quinine is made. Still higher cereals are produced and cattle are reared, but above 12,000 feet the Andes are practically barren. The mineral wealth of the region is great, and gold and silver are mined in Colombia.

Towns.—Most of the population, which consists of pure and mixed descendants of the Spanish conquerors and native Indians, live on the plateaus on account of the climate. **Quito,** the capital of Ecuador, is thus a healthy city, though practically on the Equator. It is connected by railway to the port of **Guayaquil. Bogota,** the capital of Colombia, has likewise a high and healthy situation. **The chief export** of Ecuador is cacao, and of Colombia, coffee.

THE CENTRAL ANDEAN REGIONS, PERU, AND BOLIVIA.

Relief.—South of the plateau of Quito three ranges are discernible for some distance southwards, but finally converge together and then divide into two to enclose the high plateau of Bolivia. On this plateau lies Lake Titicaca, which has no outlet to the sea, and is overlooked by Mount Sorata and several other very high peaks.

Climate and Productions.—The coastal plain has a hot and rainless climate. Agriculture has, therefore, to depend on irrigation, and where water is obtainable from the short rivers which rise in the snows of the Andes and cross the plain, crops of cotton and sugar are grown. On the Andes and the plateau of Bolivia the climate is also dry, save for the eastern slopes, which receive moisture from the south-

east trade-wind. These slopes are known as the Montaña, and are densely forested, yielding cinchona bark and rubber; while cacao is grown in places. Potatoes and barley are cultivated on the high plateau, but the prevailing vegetation is grass, which affords food for sheep, llamas, alpacas, and vicuñas. The wool of these animals is exported and their flesh eaten, while the llama is also useful as a beast of burden. The Andes are rich in minerals, the most famous silver-mines lying near Pasco, in Peru, and Potosi, in Bolivia. Tin is mined in Bolivia east of Lake Titicaca.

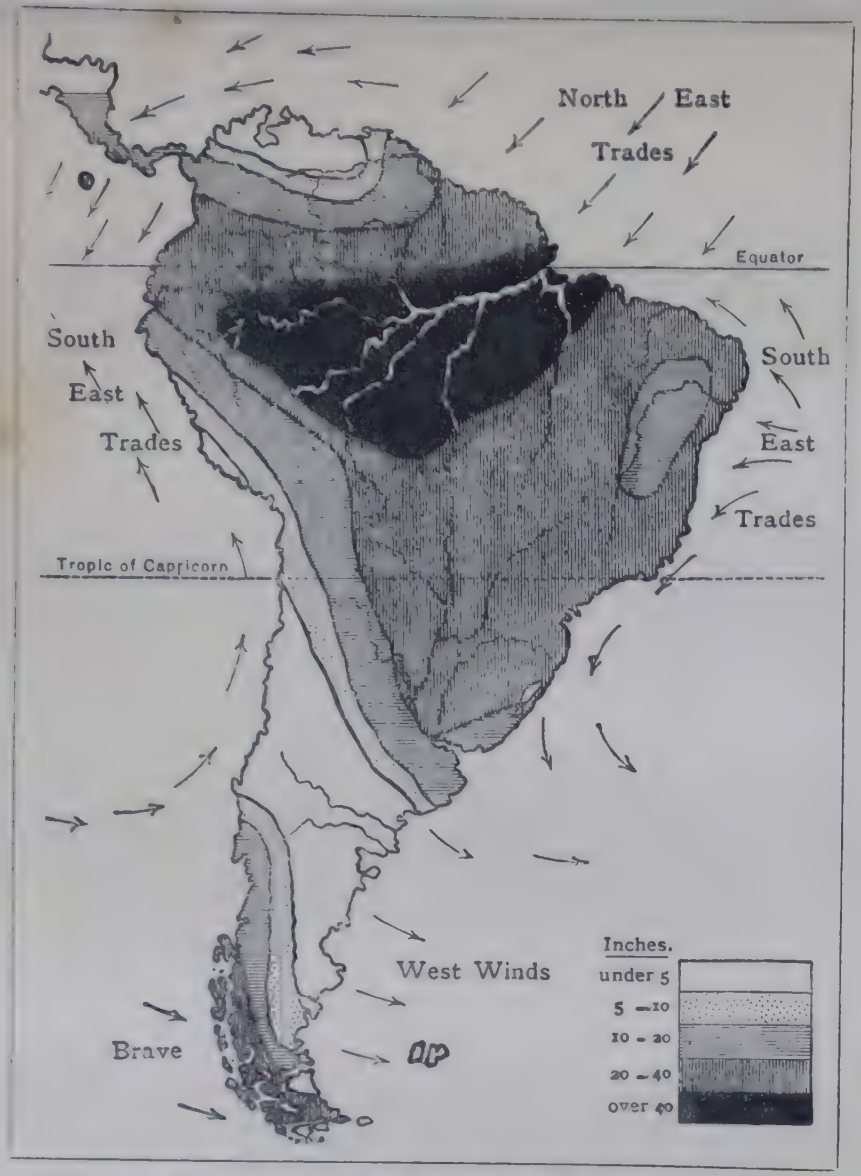
Towns.—The population in Peru, and still more markedly in Bolivia, consists chiefly of native Indians, the rest being of Spanish, or mixed Spanish and Indian descent. **La Paz,** the capital of Bolivia, is at an altitude of over two miles. **Lima,** the capital of Peru, is an unhealthy city near the coast. Its port is Callao. A railway has been made from Callao and Lima to Pasco. **The chief exports** of Bolivia are tin, silver, and rubber; and from Peru, sugar, silver, and cotton.

SOUTHERN ANDEAN REGIONS, CHILE.

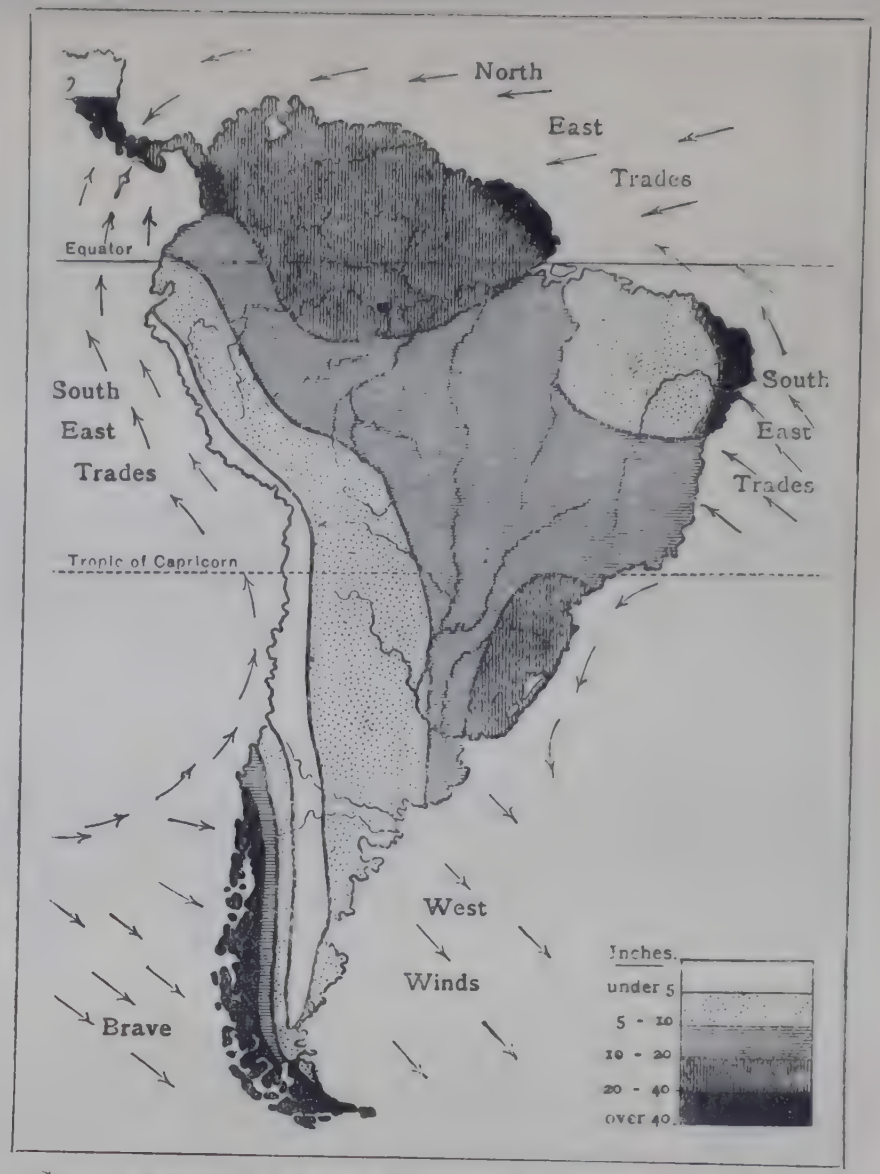
Relief.—The two ranges which flank the plateau of Bolivia unite at Mount Aconcagua. This volcano, which is about 23,000 feet high, is the highest peak in the Andes. It stands just north of the Uspallata Pass, which is nearly 13,000 feet high, and has been tunnelled for the railway which connects Buenos Aires and Valparaiso. South of this pass there is only one important range, but remnants of another exist near the west coast of Middle Chile, and are seen in the chain of islands farther south. The long narrow coastal belt which forms Chile can be divided into three parts on account of differences of climate, but the temperature of all is somewhat reduced by the cold Peru current, which washes its shore, and partly causes the curious curve in the isotherms of this district (see p. 231).

Northern Chile has the same hot, dry climate as coastal Peru. The Atacama Desert is valuable, however, on account of the deposits of nitrate of soda which occur there, and the guano, which is collected for fertilizing purposes. These are chiefly exported from Iquique. Farther south copper and silver are mined.

Middle Chile has a warm climate, and is characterized by winter rains and summer drought. The chief crops are wheat and barley, and such fruits as grapes and olives—productions, in fact, similar to



SOUTH AMERICA : MEAN SUMMER RAINFALL—*i.e.*, DECEMBER, JANUARY, FEBRUARY.



SOUTH AMERICA : MEAN WINTER RAINFALL—*i.e.*, JUNE, JULY, AUGUST.

those of the Californian Valley in the United States. Most of the population of Chile is concentrated in the valley, where lies the capital, **Santiago**, and in the large port of **Valparaiso**, which is the terminus of the line from Buenos Aires.

In **Southern Chile** the sea and mountains have left little room for lowlands where agriculture might be carried on ; while the cool wet climate prevents the growth of wheat, though potatoes are grown by the natives on some of the islands. The western slopes of the Andes are densely forested, and in a few places there are pastures on which sheep can be reared. On account of the strong currents in the Straits of Magellan some ships prefer to go south of Cape Horn, though both routes are equally stormy.

By far the most valuable **exports** from Chile are nitrates, other important exports being copper, iodine, wheat, and silver.

SOUTH AMERICA—REVISION.

CLIMATE AND VEGETATION.

South America can be divided into the following climatic areas* :

1. **Regions North of the Amazon Basin.**—Here the climate is hot and wet in summer. The prevailing wind is the north-east Trade. The natural vegetation consists of grass-lands, like the Llanos, and forests. Such products as coffee, cacao, and sugar do well.

2. **The Amazon Basin.**—The temperature is very hot at all seasons, and the rainfall excessive. Most of the basin is occupied by forests, which have an economic value on account of the rubber collected from them.

3. **Southern Brazil** and the basins of the Parana, Paraguay, and Uruguay. The temperature is warm in winter, hot in summer. The prevailing wind is the south-east trade-wind, which brings most rain in the hot season. The natural vegetation is forest mainly in the north and grass in the south. The chief crops are coffee in coastal Brazil and cereals in Argentina.

4. **Patagonia** has a cool, dry climate, and is mainly either barren or a poor grass-land.

5. **The Andean Plateaus** are cool on account of their height, and

* For maps, see pp. 231, 241, 327, 329 ; and for statistics, p. 344.

dry. The high ranges are covered with snow on their summits or barren. Lower down they are clad with pastures and forests.

6. **Coastal Peru and North Chile** have a hot, dry climate, and are deserts.

7. **Middle Chile** has the typical Mediterranean climate and vegetation.

8. **Southern Chile** is cool, and receives much rain from westerly winds. The chief vegetation is forests.

FAUNA.

Central and South America belong to the Neotropical Province (see p. 331).

The Neotropical Province is very rich in animal life, and remarkable for its many distinct species. One of its peculiar animals, the opossum, is, however, also found in the Nearctic Province. Besides opossums, the Neotropical Province possesses tapirs (only found elsewhere in Oriental regions), many peculiar kinds of sloths, armadillos, and ant-eaters, as well as monkeys remarkable for their prehensile* tails. The lion and the tiger of the Old World are here replaced by the puma and the jaguar, while the llamas and alpacas which inhabit the Andes resemble diminutive camels. Among the distinctive birds are the rhea, a kind of ostrich, the condor, or mighty vulture of the Andes, the beautiful tiny humming-bird, and many varieties of parrots. The province is also rich in reptiles (including the boa-constrictor among its snakes), as well as in insect life.

Although the West Indies are generally considered to lie in the Neotropical Province, their fauna shows that they are in a transition belt between the Nearctic and Neotropical, exhibiting features of both. In winter, moreover, a large number of birds from northern regions migrate hither. These islands, like all other islands, are poor in native mammals, and their existence at all can only be explained by a supposition that at one time the islands were connected with the mainland.

For map showing the distribution of population, see p. 335; and for statistics, see p. 350.

* 'Prehensile' is derived from a Latin word meaning adapted for seizing or holding.

(1) Under 600 feet high. (2) 600 to 1,500 feet high. (3) 1,500 to 3,000 feet high (4) Over 3,000 feet high. - - - - - - = Hundred fathom line.

AFRICA: RELIEF. (After the Diagram Co.)

AFRICA.

CONFIGURATION.

AFRICA extends from 37 degrees north to 34 degrees south, and thus the Equator passes nearly through the middle of the continent, though the northern portion is more than double the size of the southern. It is bounded by the Atlantic Ocean on the west, by the Southern on the south, and by the Indian on the south-east. On the north the Mediterranean divides it from Europe, and on the north-east the Red Sea and Gulf of Aden separate it from Asia.

Africa has so compact a shape that, with an area about three times that of Europe, it has a coast-line about a thousand miles shorter. With the exception of the Atlas region, the continent is a great tableland; but the portion that lies north-west of a line drawn from the mouth of the Congo to the Red Sea is lower than that on the south-east. The natural regions of Africa are chiefly due to differences in climate.

NORTH AFRICA.

THE ATLAS REGION.

Relief.—The parallel ranges of the Atlas enclose plateaus, and are shorter and lower in the east than in the west, where the **Great Atlas** rises as a continuous wall above the snow-line, and is comparable to the Alps. Parallel to the Great Atlas, and south of it, runs the **Anti-Atlas,** the direction of which is continued eastwards in the Saharan ranges that lie south of the Algerian plateau. The coast ranges, sometimes called the **Little Atlas,** form headlands where their north-eastern ends terminate on the coast of Algeria and Tunis; while the branch of them on the west, called **Er Rif,** where it terminates at the Strait of Gibraltar, forms the promontory between Ceuta and Tangier. All these ranges are due to folding of the earth's crust ages ago. Between these ranges and the sea there is a series of valleys and small plains, known as the **Tell.**

Rivers.—The ranges are notched in places by deep, and in some cases inaccessible, gorges, due to rivers flowing either towards the sea on the north, or into the valley which bounds the region on the south, and is in parts below sea-level. Some rivers, on the other hand, as the Mejerda, flow parallel with the ranges; but most of these end in the shallow salt lakes called 'shotts.' The Wadi Draa forms for some distance the southern frontier of Morocco. Its waters rarely reach the Atlantic.

Climate.—The temperature varies with the altitude, but in the valleys the winters are mild and the summers are hot. The rainfall is mainly brought by the westerly winds in winter (see p. 251). Though the ranges promote the rainfall on their seaward slopes by forcing winds to rise in front of them, they tend to cut off the interior of the country from moisture.

Productions.—The ranges were once covered with forests, but most of the trees have been cut down, and parts are very sterile. The commonest trees existing are various evergreen oaks, and on one species the kermes insect thrives, which, like the cochineal of Mexico, yields a scarlet dye. Grass and various scrub plants are the prevailing vegetation, and afford sustenance to flocks of camels, horses, sheep, and goats. Alfa, or esparto grass, also grows on the plateaus, mainly in Algeria, and is exported for the manufacture of paper. The Atlas Ranges in Algeria

are rich in iron and marble, while in Tunis they abound in phosphate and zinc, besides other minerals little worked at present.

The coastal plains and valleys are fertile wherever the rainfall is adequate or supplemented by irrigation, which has been done to a great extent in Algeria by means of artesian wells. Large crops of wheat, barley, grapes (chiefly for wine-making), and other Mediterranean fruits are cultivated, and the cork oak is a noted product of the mountains north of the Mejerda Valley. These crops are occasionally devoured by locusts. Fish are caught off the coast, chiefly tunny and sardines, and some sponge and coral are obtained off Tunis.

The **inhabitants** of the Atlas region, as throughout North Africa, belong to the Caucasian race, with the exception of some negro servants and slaves in Morocco. The great majority of the population are either Berbers or descendants of the Arab invaders, who are generally called 'Moors.' The Berber element is preponderant in the country districts, and has given rise to the term 'Barbary,' which is sometimes applied to the States of Morocco, Algeria, Tunis, and Tripoli. In the towns the Moors predominate, and are conspicuous figures, with their flowing robes, which are generally white, hooded cloaks, turbans, and yellow slippers. The women, however, lead a very secluded life, and are always veiled in the presence of strangers. The Arabs who spread westwards from Arabia across North Africa in the seventh and eighth centuries were known as Saracens, and introduced the Mohammedan religion. This is now the common religion throughout North Africa.

Politically the Atlas region is divided into the French colony of Algeria, and the Protectorates of Tunis and Morocco. All these also include desert districts to the south.

MOROCCO.

This country suffered much from misgovernment in the past, when it was an independent sultanate. It has recently been acquired by the French. The most primitive methods of agriculture are in vogue, and commerce suffers from the lack of railways and good roads. **Fez** is the largest city and present capital, though Morocco and Mequinez also are sometimes regarded as capitals. Its manufactures include Morocco leather—made from goat-skin—red fez caps, silk goods, and rugs. The chief ports are **Tangier** and **Mogador**, whence are exported hides, wool, oxen, eggs, slippers. The fortified town of **Ceuta** belongs to Spain

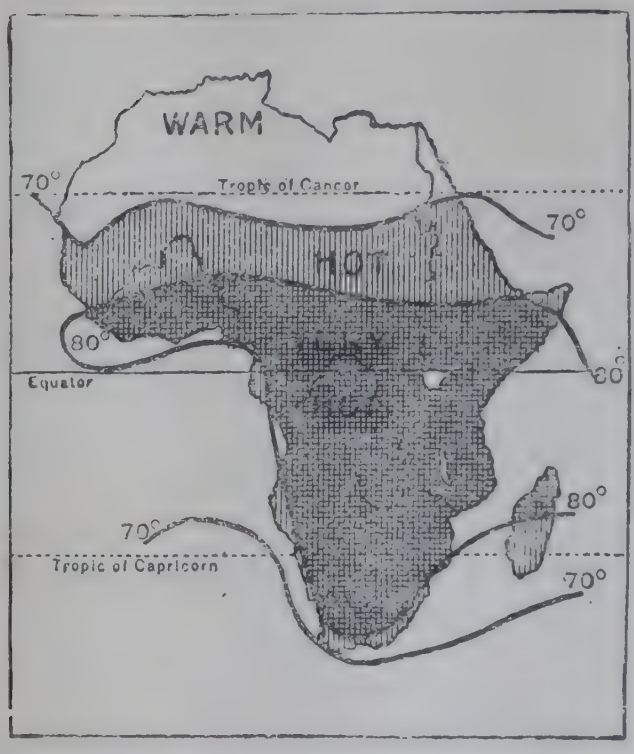
North-West Africa: Political and Economic.

ALGERIA AND TUNIS.

Algeria.—The French have done much to develop this country by irrigation and the construction of harbours, roads, and railways; but these works, and the heavy military expenses incurred in maintaining order, have resulted in the creation of a large debt. The mild climate causes many of the towns to be winter resorts for Europeans, but nearly seven-eighths of the total population is native. The main railway runs from the port of **Oran** to Tunis, passing through Algiers. From it there are branches northwards to other ports, and southwards to **Biskra** and to certain places on the desert margin, which are noted for dates and as caravan termini. **Algiers**—the capital of the country—has a good harbour, and is now an important coaling station. Constantine—the largest inland town—has a very secure position on a rocky elevation above a precipitous ravine. **The chief exports** of Algeria are wines, animals, cereals, cork, wool, and zinc. The country trades chiefly with France.

Tunis.—The most valuable portion of this Protectorate is the Mejerda Valley, and its natural outlet is **Tunis,** the capital and chief port of the country. By means of a canal, large vessels can now ascend the shallow lagoon which leads to the city. **The chief exports** are phosphates, barley, olive-oil, wheat, esparto grass, and zinc.

ISLANDS OFF THE NORTH-WEST COAST.



AFRICA : ISOTHERMS FOR JANUARY.

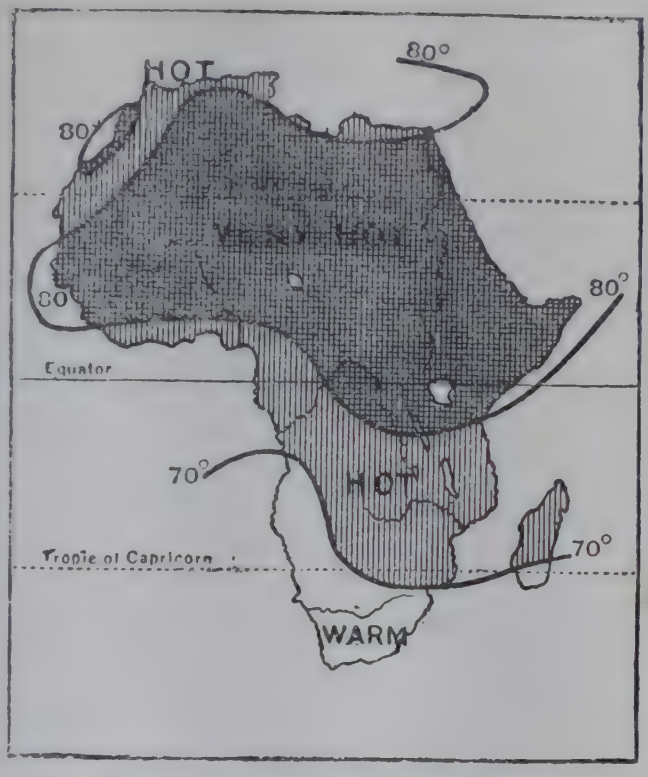
These are arranged in four groups—the Azores, Madeira, and Cape Verde Islands, which belong to Portugal, and the Canaries, which belong to Spain. They are of volcanic origin, but most of the volcanoes are now extinct. Most of the islands are mountainous, and were originally well covered with woods ; but in some parts these have been cut down, with the result that fertile soil has been swept away by the rain, and considerable areas left barren. The rainfall is very fair over the Azores and Madeira, but scanty over the other groups, and the Cape Verde Isles are rather sterile.

The **Madeiras** are noted for their fertility, and obtain their name from the forests, which are still numerous, the chestnut being the prevailing tree. The scenery is picturesque on account of the deep valleys and precipitous cliffs, combined with luxuriant vegetation and beautiful flowers. The chief products, both here and in the **Azores,** are wine and Mediterranean fruits, the latter group being particularly noted for oranges.

The **Canaries** also produce oranges, as well as bananas, tomatoes, and potatoes. Cochineal insects are reared on the **prickly pear.** This plant, which is common in North and South Africa, produces a juicy, though rather flavourless, fruit. It also bears numerous poisonous thorns, and is sometimes used for hedges, though apt to spread as a weed. The islands have experienced many earthquakes and volcanic eruptions in the past, and the chief isle—Tenerife—is dominated by the cone of an active volcano of that name. Cattle are reared on the **Cape Verde** Isles, and one island is used as a coaling station by Atlantic steamers.

THE SAHARA.

If we include under this name not only the true desert, but the scrublands which border the desert, the Sahara has an area nearly equal to that of Europe. It extends from the Red Sea to the Atlantic, broken only by the Nile Valley, and from the Atlas on the north-west and Mediterranean on the north-east to the savannas of the Sudan. The chief elevation which diversifies the surface is a range running north-westwards from the Tibesti to the Tasili Plateaus.



AFRICA: ISOTHERMS FOR JULY.

Structure.—The surface varies in different parts, in some places consisting of bare rock, and in others of beds of gravel or sand. The largest stretches of sand are the Libyan Desert in the east, and in the west an area south of the Atlas Mountains. Even these sand deserts vary in appearance, being all shades of yellow, red, brown, white, and black in different parts; and whilst fairly flat in some districts, are in others raised into sand-hills or scooped into hollows by the wind.

Climate.—The temperature is warm even in winter, and very hot during most of the year. There is, however, a considerable difference between day and night, as well as summer and winter, temperatures, which is partly due to the absence of sea winds, and partly to the barren nature of the ground, which rapidly receives and radiates heat. The area enjoys very little rain, for it lies in a belt of high atmospheric pressure, from which winds tend to blow away. Any winds from the east, moreover, will be dry, as they come overland, while the region lies too far south to receive regular westerly winds even in winter. The absence of any very high ranges is yet another cause for the drought (see p. 251).

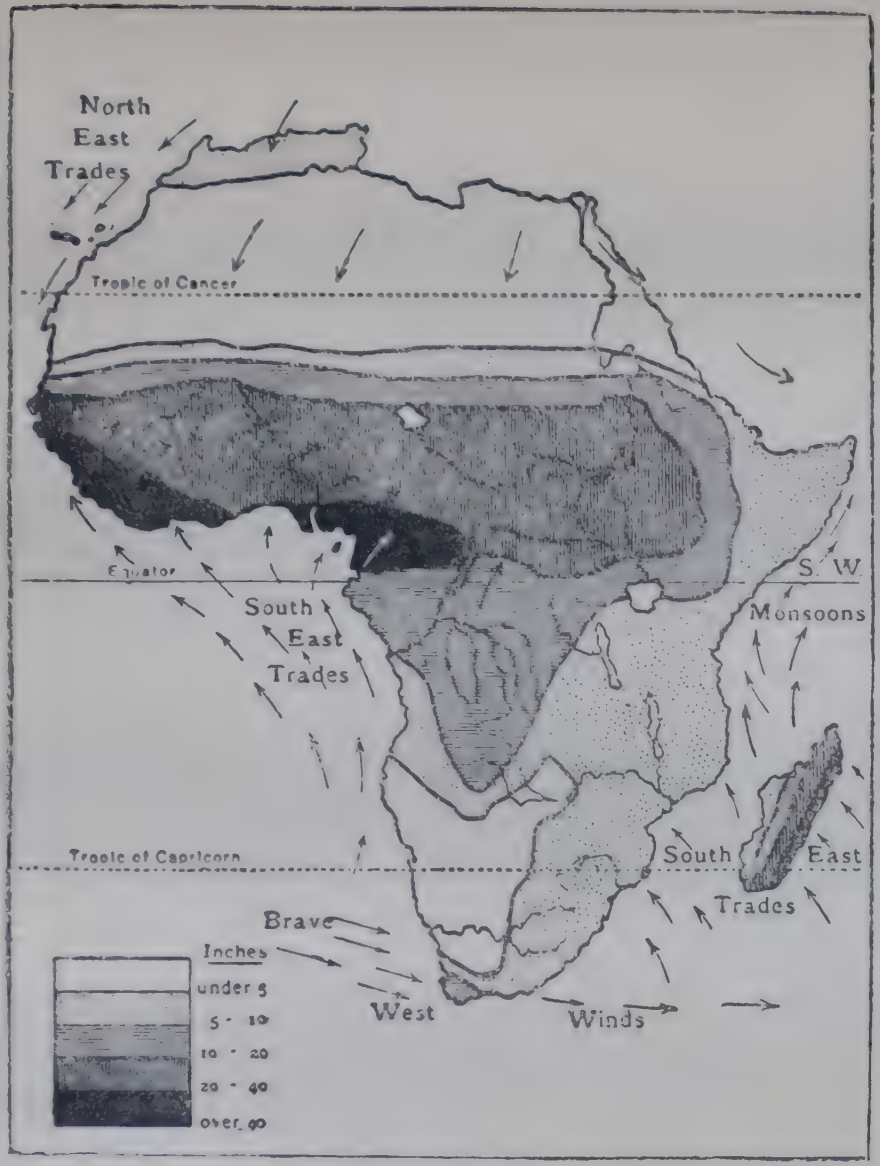
Vegetation.—Such as exists can be divided into two classes: (1) That which is dependent solely on the occasional showers that occur,

and has, therefore, a very brief existence ; (2) that which depends mainly on subterranean water, and is perennial. To the first class belong the grass and even delicate flowers which sometimes spring up in a wonderfully short time after rain, and as quickly wither away. To the second class belong the trees, shrubs, and plants which, even in a more marked degree than those of Mediterranean regions, are adapted to withstand drought. Most have deep roots—*e.g.*, the acacias, mimosas, and tamarisks, which often occur along the wadis, where moisture lingers longest ; others have succulent and thorny stems and leaves. Some of the trees yield gums, and some of the plants can be eaten by the hard-mouthed camel, but many have no economic value.

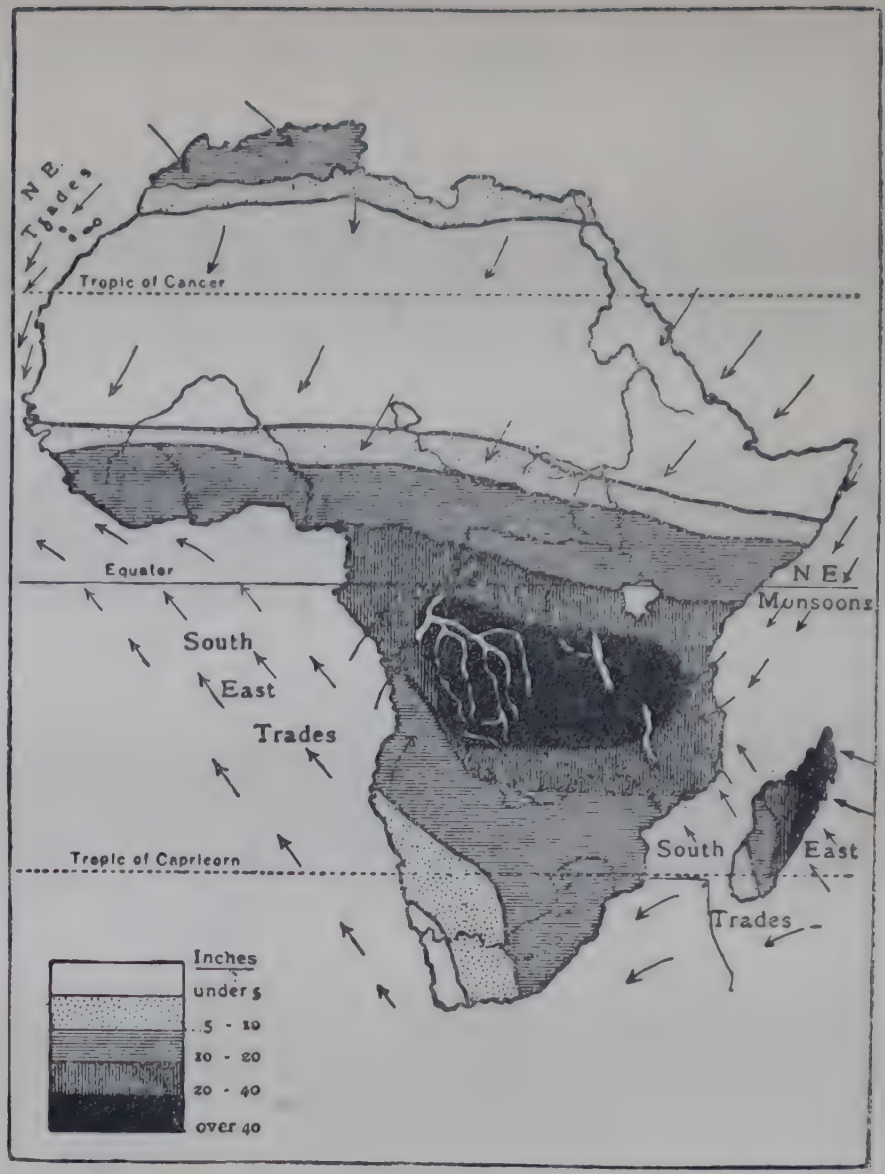
No permanent streams exist in the Sahara, on account of the lack of rainfall ; but permanent springs have created oases, which in many cases have been enlarged by means of irrigation (see p. 291). Here the date-palm flourishes, and various cereals and vegetables are grown. The villages in these oases are surrounded by mud walls and ditches for defence, and consist of mud-built huts enclosing open spaces, which are used for markets and for drying the dates. Some of the chief oases are Kufra, Murzuk, Twat, Aïr, and Tafilet. The last named is in Morocco, and especially noted for its dates.

Life.—Besides dates, the staple desert commodity is salt, which can be obtained by evaporation from saline, shallow pools like the shotts. Outside the oases life is nomadic, and is dependent on the flocks of camels, horses, sheep, and goats that can be reared on the poor grass and shrubs that exist in some districts. The usual desert fare is milk, cheese, dates, millet, and occasionally meat ; and the chief possessions of the desert tribes are tents made of leather or woven hair, couches and mats made of reeds, hair ropes, leather bags, skins for carrying water, utensils made of wood or gourd-shells, and weapons, including the favourite spear. The **Tuareg** tribes wear dark-blue cotton garments, and veils with which they protect their eyes and mouths from the sand-laden winds.

Caravans.—Commerce is carried on across the Sahara by caravans, which often consist of companies of 1,000 to 3,000 camels and their necessary drivers. These caravans bring ivory, ostrich-feathers, oil-seeds, skins and gold from the Sudan to the Mediterranean in exchange for textiles, metals, minerals, tea, sugar, tobacco, and firearms, and carry the salt of the Sahara southwards, where it is highly prized, and its dates northwards. The caravan trade is, however, suffering from the



AFRICA: WINDS AND RAIN, MAY TO OCTOBER.



AFRICA: WINDS AND RAIN, NOVEMBER TO APRIL.

virtual suppression of the slave traffic, and from competition with ocean traffic to the Gulf of Guinea. The chief caravan routes are as follows: (1) Mogador to Timbuktu; (2) Fez and various places in North-West Africa to Timbuktu via Twat; (3) Tripoli to Kano, in Northern Nigeria, via Aïr; (4) Tripoli to Lake Chad and Kuka via Murzuk; (5) Benghazi, in Barka, due southwards to the Sudan via Kufra.

Western Sahara is under French influence, with the exception of Southern Morocco and a barren strip that belongs to Spain. Eastern Sahara—*i.e.*, in Egypt—is nominally under Turkish, but practically under British, control. **Tripoli,** including Barka, which occupies the central portion of the northern area, was a Turkish province, but is now claimed by Italy. It has little commercial value, and the only cultivated portions are a few coastal strips and some scattered oases. Esparto grass, and sponges collected off the coast, are the chief exports. The chief port—Tripoli—is also the capital and the terminus of a short route across the desert.

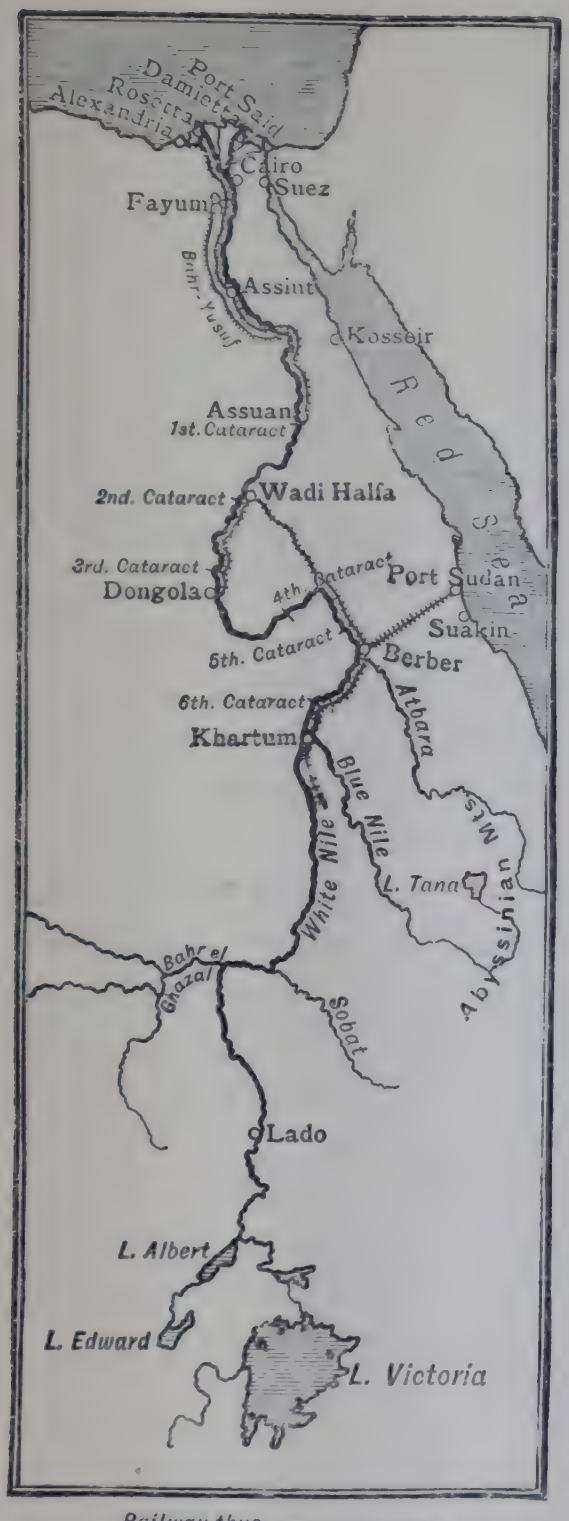
THE NILE.

This river is about 3,500 miles long. It rises in Lake Victoria,* which is fed by constant equatorial rains, and thus, though shallow, forms a perennial water-supply. After leaving the lake by rapids, the river passes through a small, marshy lake, and then descends by more falls to the northern end of Lake Albert.* This lake is connected on the south with Lake Edward.* The Nile then flows northward, and more rapids occur before it reaches Lado, after which, for some distance, the only obstruction to navigation is the **Sudd.** This is an accumulation of water plants and reeds, which are torn up by the roots in stormy weather, and form large floating islands, which collect wherever the flow of the river is slow or its channel narrow. The whole region between Lado and the confluence of the Bahr-el-Ghazal, therefore, often resembles a gigantic swamp; and clearing the river of the sudd is a slow and expensive work. Generally the reeds are burnt, and then the matted masses of roots and plants are cut up and torn away by steamers, and floated down-stream.

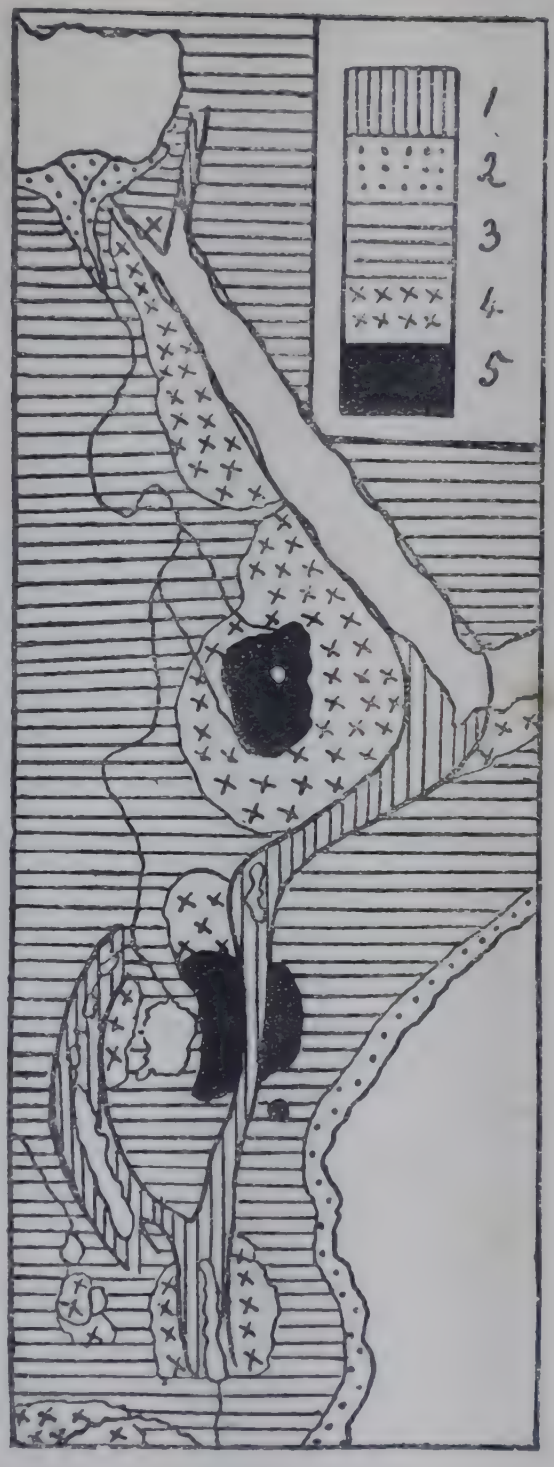
Floods.—The confluence of the Bahr-el-Ghazal and upper White Nile lies in a marshy area, which in autumn is converted into a lake.†

* The word 'Nyanza,' usually placed after this name, merely means lake, and is hence omitted to avoid a reduplication.

† In an article in the November number of the *Geographical Journal*, 1908,



THE NILE.



EAST AFRICA : STRUCTURAL DIVISIONS.

(After J. W. Gregory.)

Key to Numbers in East Africa Map.

1. Dry floor of the Rift Valley. 2. Lowlands formed of recent deposits. 3. Tablelands composed of sedimentary rocks of various ages. 4. Plateaus of ancient crystalline rocks. 5. Tablelands and mountains of volcanic rock.

Captain Lyons explains how the floods of the White Nile are partly due to the river being ponded back by the floods of the Blue Nile. Thus a reserve supply of water is formed which drains off in winter after the leve of the Blue Nile has fallen.

North of this point the rainfall and volume of the river diminish, though the Blue Nile, which joins it at Khartum, and the Atbara at Berber bring down a large supply of water after the summer rains in Abyssinia. It is these rains that cause the annual floods of the lower Nile, on which the prosperity of Egypt so much depends. Though they occur in Abyssinia in June, the flood-waters travel but slowly northward, till, early in October, the Nile has risen about 24 feet above its ordinary level at Cairo. The height to which the river rises is measured by instruments placed at various stations along its course; and as the telegraph, which follows the river, carries the news, methods can be at once adopted to meet the evils of a shortage of water or an excessive flood. If the rise at Cairo is only 21 feet, it means that large tracts of land usually irrigated will be barren; and if it rises 30 feet, there is danger that villages may be flooded and cattle drowned. The flood-waters bring down a great deal of fertile red mud from Abyssinia, which is deposited to form the floor of the lower valley of the Nile and the delta at its mouth.

Cataracts.—The lower course of the river is interrupted by six cataracts. The sixth occurs between Khartum and Berber, and renders the river turbulent for about a mile. The other five lie between Berber and Cairo, and of these all, save the first, consist of series of rapids, extending from 45 to 124 miles in length, the first being about 3 miles long. The first, which occurs at Assuan, and the second at Wadi Halfa, can be passed by vessels at high water; but the others prevent all important traffic.

During its lower course across the desert the Nile receives no tributaries; for the Bahr Yusuf, or Joseph Canal, is a distributary by which water is conveyed to Fayum in flood-time. Near its mouth the river divides into distributaries flowing across its delta.

THE LOWER NILE VALLEY—EGYPT AND NUBIA.

This valley extends across the desert from the sixth cataract to the sea, varying in width from about 5 to 20 miles, and expanding over the delta. Though constituting a very small proportion of the area of these countries, it supports nearly all the population of Nubia and Egypt on account of its fertility, which is partly due to the fertile mud brought down by the flood-waters from Abyssinia, and partly to irrigation dependent on these floods. There are two great systems of irrigation in vogue: one called 'flood irrigation,' which is only possible at the time

of the flood, and another which can be carried out at any season, and is called ' perennial.'

Flood Irrigation.—This system consists in leading off the flood-waters by means of canals crossing the fields, which are embanked so that the water can remain on the ground about seventy days, and deposit the fertile silt as well as saturate the land. At this season the valley looks like an inland sea divided into basins by the embankments, and diversified with islands that form the sites of villages and places of refuge for cattle. This system, however, has the following drawback: though after the flood season, which extends over the autumn, such crops as wheat, barley, clover, lentils, onions, and beans may be cultivated, since they can endure winter temperature, the ground must lie barren during the summer, because it is then baked hard by heat and drought. Hence the most valuable crops which require moisture and heat at the same time—*e.g.*, cotton, sugar, some kinds of rice, and certain fruits—cannot be grown on land thus irrigated, and for them another method is required.

Perennial Irrigation.—Since early times, by means of water-wheels, and water-lifts called shadufs, water has been raised from the Nile and used to irrigate small areas at all seasons. Steam-pumps also are now used ; but in order to irrigate large areas perennially it has been necessary to construct great dams across the Nile, so as to turn long stretches of the river into vast reservoirs which can supply canals with water all the year round. There are now dams, called ' barrages,' across the two distributaries of the Nile at the head of the delta, as well as at **Assuan** and Siut. That at Assuan is about $1\frac{1}{4}$ miles long, and looks like a stone wall fitted with sluices, which are opened in flood-time and closed when the Nile is low. This dam raises the water for nearly 200 miles behind it. The Bahr Yusuf, which supplies **Fayum** with water, is itself supplied by a canal from the reservoir behind the Siut dam. Though crops can be grown at any season on land thus irrigated, the soil has to be manured, for the fertilizing silt is deposited in the reservoirs instead of on the fields, as in flood irrigation.

Crops.—By far the most valuable crop grown in Egypt is **cotton,** which is sown in the spring and picked in the autumn. Other important crops are sugar—chiefly grown south of Cairo, where there are several sugar-refining factories—and rice, which is grown largely over the delta, and taken to mills at Damietta and Rosetta, that the grain may be

separated from the husk. Maize and millet form the staple food of th peasantry, and, in the absence of much grass-land, the cattle are fe largely on maize-stalks and clover. Wheat, barley, pulses, and man fruits and vegetables, do well, but the country is poor in timber.

Minerals.—Though deficient in most minerals, save salt, Egypt i rich in building material. Besides the red granite of Assuan, which wa used ages ago for temples and monuments, and recently for the grea dam, there is plenty of suitable limestone and sandstone, and the mud of the Nile makes good bricks and pottery.

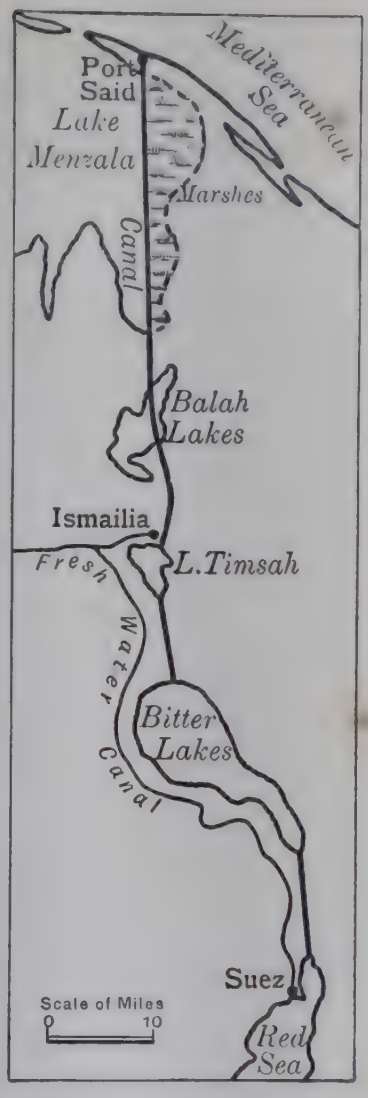
Railways are numerous over the delta, and one runs south from Cairo along the river to Assuan, and, after a break between that town and Wadi Halfa, is continued to **Berber** and Khartum. From Berber there is a railway to Port Sudan on the Red Sea. The other chief modes of transport are by boat or camel caravan, for there are few good roads. Not only are the larger canals navigable, but boats can at high water ascend the Nile to a point above the second cataract, and their ascent against the current is aided by the prevailing northerly or **Etesian winds.** On account of the indraught up the Nile Valley to the heated interior, these winds are strongest in summer, and they are often supplanted in spring by a hot, sand-laden wind from the south called the **Khamsin.**

Cairo, the capital of Egypt, has a good situation at the head of the delta, and is the largest city in Africa. Besides the industries already mentioned, it has a large tourist traffic, due to the fitness of its fine climate for a winter resort and to the wonderful Pyramids which are near it. These Pyramids are the tombs of some of the early Pharaohs, and perhaps date back to 4000 B.C. Their preservation is partly due to the dry atmosphere. The early civilization to which these monuments bear witness was due to the fertility of the Nile Valley—fertility secured when methods for utilizing the Nile floods were discovered—and to the protection afforded by the desert, which made it possible for arts to develop with little warlike interruption. There was, moreover, no lack of building material, and the cultivation and manufacture of flax, and the mining of gold and copper, then found in Egypt and the peninsula of Sinai, rendered the country in the main self-sufficing, and rich enough to develop a high standard of culture.

Alexandria, the chief port of Egypt, stands on a strip of land between a lake and the sea, and to the west of the mouths of the Nile

Since a current sweeps the silt deposited at these mouths eastwards, Alexandria is not liable to be obstructed with sand-bars, as the ports of Rosetta and Damietta have been. **Port Said,** at the northern entrance to the Suez Canal, has been obliged to construct long piers, to protect its harbour from silt and the strong north winds. It is a convenient coaling station, and has a large entrepôt trade.

The **Suez Canal** was opened in 1869. It is about 100 miles long, if we include the lakes it passes through, and is 27 feet deep; but it is only wide enough for vessels to pass at certain places, though this fault is being remedied. The tolls levied on goods and passengers are so heavy that some ships find it cheaper to go by the Cape route whenever the consequent delay is not important. About three-fifths of the vessels which pass through the canal are British. A railway follows the canal to Suez, and from Ismailia there is a branch to Cairo. A navigable fresh-water canal from the Nile also joins the Suez Canal here, and branches of it supply Port Said and Suez with fresh water. **Suez** is an unhealthy Arab town, and has not derived much benefit from the canal.



THE SUEZ CANAL

Exports.—Raw cotton is by far the most important export from Egypt. Others are cereals and vegetables.

THE EASTERN HORN.

THE AFRICAN COASTAL BELT OF THE RED SEA.

This is a low desert strip between the tableland of the interior and a straight coast-line fringed with coral reefs that render navigation dangerous. Opposite the Straits of Bab-el-Mandeb the strip broadens into a triangular plain between the highlands of Abyssinia and the mountains running east and west across Northern Somaliland to Cape Guardafui.

This plain is the beginning of the Rift Valley of East Africa (see p. 271). South of Egypt the seaboard belongs to Italy, which possesses **Eritrea**, and to France, which owns **Obok.**

SOMALILAND.

This tableland is a region of inland drainage, and the largest river—the Webi—ends in a swamp, though only separated from the coast by low sand-hills. On account of the arid nature of the climate, the prevailing scenery is that of poor grass-land, dotted with grey, thorny shrubs; but there are rich pastures in the middle valley of the Webi, where large numbers of camel, cattle, sheep, and goats are reared. The chief vegetable products are myrrh, frankincense, and various other gums, which exude from the trees and shrubs.

The area abounds in wild beasts, and part of **British Somaliland** is a game-preserve for the officers from Aden, who, moreover, depend largely on the flocks of the scanty pastoral population for their meat-supply. **Berbera**, the chief port of the British territory, has a good harbour, and, like our possessions of Aden and the isles of Perim and Socotra, has strategic value as guarding the Red Sea route.

THE TABLELAND OF ABYSSINIA.

This rises precipitously on the east, and falls more gradually on the west, while a central depression is partly occupied by Lake Tana, in which the Blue Nile rises. The tableland is built up of sheets of volcanic basalt, and is much dissected by the very deep gorges which the Blue Nile and Atbara and their tributaries have cut. These rivers are not navigable, but are valuable on account of the torrents of water and the fertile mud which they carry down to the Nile Valley after the summer rains. Their valleys render communication very difficult, both with the tableland and within it; for they are not suited to serve as routes in themselves, and to cross them it is sometimes necessary to ascend and descend 4,000 feet. This feature has helped to render the country highly defensible, and partly explains how it has been able to maintain its independence. It has also isolated it from outside influences, so that, though the surrounding populations are Mohammedan, the established religion of Abyssinia is still a debased form of Christianity introduced in the fourth century.

Vegetation varies with the altitude. The lower valleys are unhealthy, and densely wooded in parts; but cotton, sugar, and coffee can be cultivated on the lower slopes. At 5,000 to 9,000 feet of altitude the temperature resembles that of Southern Europe, and Mediterranean fruits and cereals are grown. Still higher some hardy crops are cultivated and flocks reared, but vegetation gradually diminishes with the ascent, and some of the higher peaks are snow-clad.

Abyssinia is probably rich in minerals, but the only ones worked at present are iron, salt, and a little gold-dust. The inhabitants, who are mainly of Caucasian origin, but much mixed through intermarriage with the negroes, lead a pastoral life, and dwell in round huts of stone, mud, or wood, with thatched, conical roofs and mud floors. The government is despotic, and upheld by a large army. The present capital is **Addis Abeba,** but **Harrar** is the largest town, and is connected by railway to the coast.

THE SUDAN.

The word 'Sudan' simply means the 'land of the blacks,' and refers to the dark-coloured negroes who inhabit most of this area, which may be taken to extend from Cape Verde—*i.e.*, green cape—on the west to the base of the Abyssinian highlands on the east, and from the Sahara on the north to the forests of the Upper Guinea coast and the Congo Basin on the south. The area can be subdivided into the basins of the Middle Nile, Lake Chad, the Middle Niger, the Upper Niger, the Senegal, and Gambia.

Climate.—The temperature is high throughout the Sudan, and is greater in summer than in equatorial districts. This causes a tendency for winds to blow towards the region at that season, and for the air to rise, thus bringing about the condensation of whatever moisture they contain. The rainfall is greatest in the south, and diminishes towards the north (see maps on pp. 248, 249, 251, and 327).

Vegetation.—The characteristic scenery has been called 'savanna,' and consists of a mixture of grass and woodland. The trees are dense only along the river-courses, and elsewhere grow in clumps, giving a park-like aspect to the scene. The grass often grows to a great height, but is usually burnt down annually by the natives, that a fresh, tender crop may grow up for their flocks.

THE BASIN OF THE MIDDLE NILE.

This extends from Lado, where the Nile descends from the equatorial highlands, to the sixth cataract, and consists of a fairly flat, low table-

land. The length of the basin prepares us for great differences in the climate and scenery of northern and southern parts.

The Southern Portion.—In the south it is hot, very rainy in summer, and unhealthy for Europeans. Here the upper valleys of the Bahr-el-Ghazal and its tributaries are clad with forests which yield rubber, and their lower courses are choked with the sudd. In some parts the rivers flow slowly for many miles through vast swamps overgrown with papyrus, which often attains a height of 15 to 20 feet. Both hippopotami and crocodiles are numerous in the rivers, and mosquitoes are a terrible pest near the swamps. There are prairies of tall grass on the west of the Nile, and as the soil is fertile, many parts are well suited for agriculture. The district is well populated by negroes, who live chiefly by fishing and collecting forest products. The chief place in the south is **Fashoda**—just below the confluence of the Sobat—and this is little more than a collection of straw-built huts, and lies in an unhealthy swampy region. Its importance is due to the water routes which converge here, and to its command of the water-supplies on which Egypt depends.

The Northern Portion.—North of Fashoda the rainfall is much less and the climate more healthy. Most of the country is grass-land dotted with trees, and devoted to rearing flocks of cattle, donkeys, sheep, and goats. Tall ant-hills form a common feature in the landscape, and locusts are sometimes a plague. Ostriches, which roam over the plains, are caught for the sake of their feathers, and gums are collected from the forests which fringe the upper courses of the Blue Nile and Atbara Along the lower courses of these rivers, and by the banks of the White Nile, large crops of millet are grown, as well as lentils and other vegetables, and some cotton. Population is dense in the agricultural areas, and especially along the west bank of the White Nile, between the Blue and White Niles near their confluence. Most of the natives live in straw huts of beehive shape. The capital of the Sudan is **Khartum,** situated at the confluence of the Blue and White Niles. The former capital for a brief period was Omdurman, just opposite, on the left bank of the Nile.

LAKE CHAD.

This is a shallow, fresh-water, island-studded lake, which varies in size with the season, and is on the whole diminishing. Its northern

shores consist of sand-hills, which merge into a poor scrub-land yielding little but gum, while its southern margins consist of swamps and forests, which gradually give place, away from the lake, to rich pastures, and fields producing large crops of millet, pulses, cotton, tobacco, and indigo. The lake itself is the haunt of numerous water-fowl, as well as of many flamingoes and herons, and the swamps are infested by reptiles. The land surrounding the lake on the north and east belongs to France, but on the south-west it is bordered by British Nigeria and the German State of Kamerun.

THE NIGER

The Niger descends as a swift river from the wooded highlands of Futa Jallon, and becomes a navigable waterway about the terminus of a railway from Senegal. It then traverses a rich pastoral and agricultural country, dotted with trees, including the kola and the shea. The **kola** trees bear long pods, each of which contains from four to six nuts resembling large chestnuts. From these nuts a bitter but stimulating drink is made, which is very popular south of the Sahara and west of Lake Chad. The **shea** trees bear seeds which also rather resemble chestnuts, but yield a vegetable butter used for lighting and cooking purposes. A little further on the river splits up into a maze of sluggish watercourses, enclosing large islands, and here and there expanding into lakes, rich in fish, and in swamps, where rice is grown.

Timbuktu.—Below this the river passes the port of Timbuktu, which is connected with that town by a channel navigable only at time of flood. At this point the Niger is deflected eastwards by the edge of the Saharan tableland, and Timbuktu owes much of its importance to its situation at 'the meeting-place of all that comes by camel and canoe.' Two caravan routes lead northwards from it—one to Morocco, and the other to Algeria and Tunis—and it will also gain importance from the railway between the Niger and Senegal, which gives it an outlet on the Atlantic. Before the town fell into French hands it had lost much of its former prosperity on account of attacks from desert tribes, but these have now been checked.

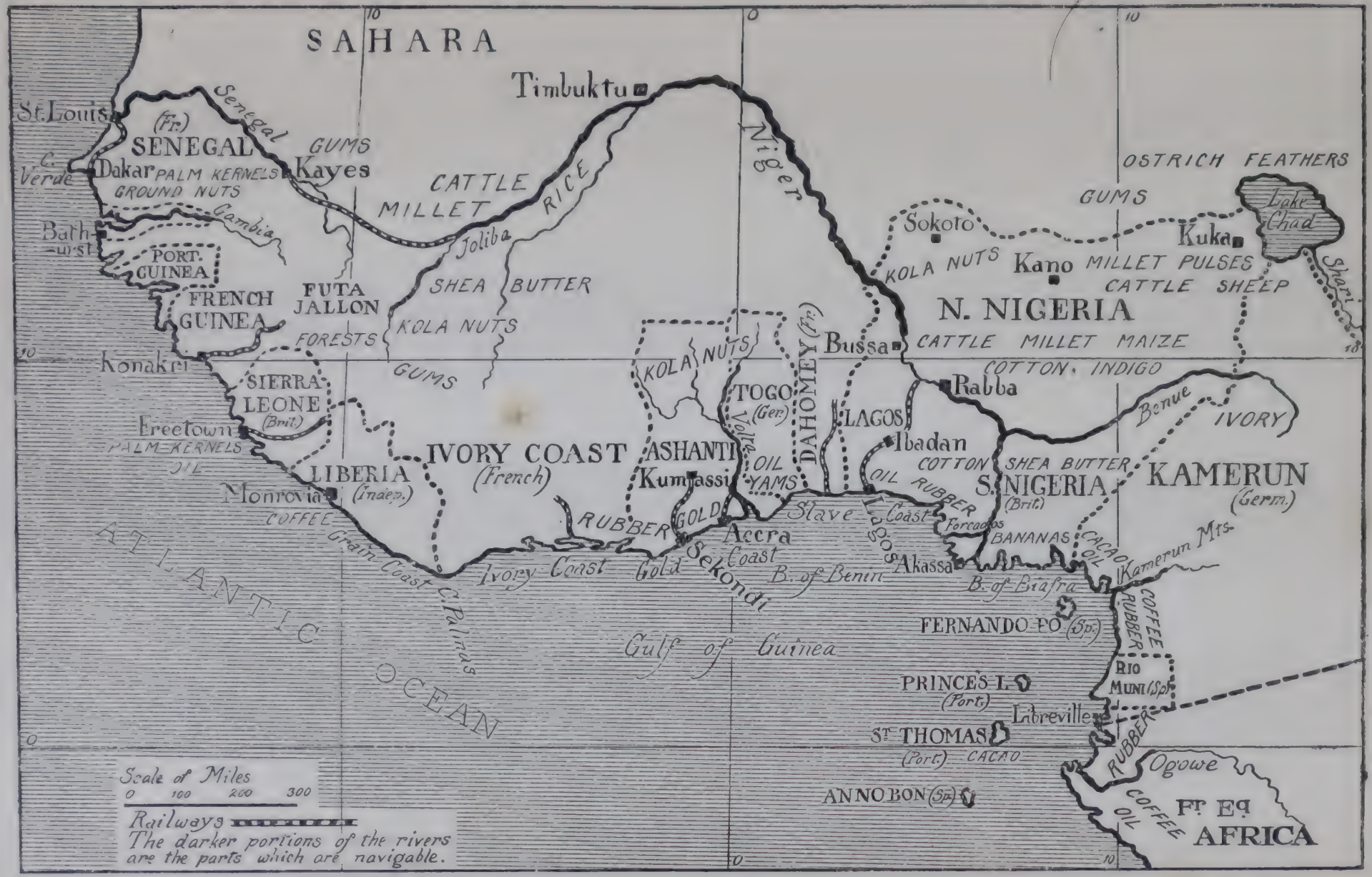
Further on the Niger bends south-eastwards, and after this navigation is rendered difficult by a series of rapids, which are especially dangerous just above Rabba, the point to which steamers can ascend from the coast. The Niger below Rabba receives an important navigable tributary on the left—the Benue. For much of its lower course the

Niger is almost a mile broad, and brings down a large volume of water; but near its mouth it splits up into many distributaries, which intersect its vast delta. The western branch of these is the least obstructed by bars.

NIGERIA.

Northern Nigeria, which includes, besides the middle basin of the Niger, part of Lake Chad Basin and the elevated land between these, is well populated on account of its fertility, but the chief towns lie away from the rivers. Three of these—**Sokoto** (a centre of Mohammedanism), Kano, and **Kuka**—lie in a fairly straight line, and **Kano** enjoys the advantage of an intermediate position, and of a caravan route from Tripoli, of which it is the terminus. For centuries it has been a place of great importance, and the city walls, of some 15 miles' circuit, enclose not only numerous quadrangular, flat-roofed dwellings built of red mud, but the fields and gardens in which they stand, so that the town could be self-supporting for some time in case of siege. Metal and leather work, including the manufacture of morocco leather, are important; but the chief industry is the manufacture of cotton goods, which are generally dyed with the juice of the native indigo plant. Kano blue cloth is, in fact, widely worn all over North Africa. Kano has also a great market-place, where its manufactures and the local pastoral and agricultural products are exchanged for gunpowder, silks, and various trinkets from Europe, salt from the Sahara, ostrich-feathers from the Sudan, gold-dust from the Gold Coast, ivory from the south, and, above all, for kola-nuts.

The principal inhabitants of Northern Nigeria belong either to the Hausa or Fula tribes, and are energetic and prosperous. The **Hausa** are a powerful negroid people of good physique, who have obtained a comparatively high standard of civilization, probably from contact with white races to the north, from whom they received their religion—Mohammedanism. Their language is widely spoken throughout the Sudan, and they have also a certain amount of literature. The majority are engaged in agricultural pursuits, but some are traders, and others are employed by Government as police or soldiers. The **Fulas,** who dwell among them, and are also Mohammedans, are of Hamitic origin, but crossed by negro blood. They are chiefly occupied in pastoral pursuits.



WEST AFRICA: POLITICAL AND ECONOMIC.

Southern Nigeria and Lagos experience the hot, wet, unhealthy climate of the Guinea Coast. The low ground is forested, and the chief productions are palm-oil and rubber. **Palm-oil** is obtained from nuts resembling plums, each of which is embedded in a fruit which grows on the top of a kind of palm. The nuts are crushed and boiled, and the oil is skimmed off the top. This oil is particularly suited for soap and candles. The town of **Lagos** is built on an island in a lagoon which is inaccessible for large vessels. A railway has been carried inland from Lagos to the Niger. Nigeria and Lagos are British possessions.

THE BASINS OF THE SENEGAL AND GAMBIA.

The Senegal and Gambia, like the Niger, rise in the Futa Jallon highlands, and descend from them by rapids. The Senegal is navigable from the junction of the railway to the Niger and the Gambia for most of its course. The Senegal traverses a poor grass-land, and the chief product is oil, which is obtained both from the seeds of a herb called 'sesame' and from **ground-nuts,** or pea-nuts, which occur inside little pods on a plant, and ripen underground.

Near its mouth the Senegal divides into several channels, which empty into a lagoon nearly cut off from the ocean by sand-bars. **St. Louis**—the capital of Senegal—stands on an island in the river near its mouth, and in stormy weather it is dangerous for ships to enter the lagoon to reach the town. The French own the coast-line as far north as Cape Blanco, but **Gambia,** on the south, which consists of the lower valley of the river of that name, is British. The river has a broad estuary, and Bathurst—the capital of Gambia—stands on the southern side.

UPPER GUINEA.

This is the belt of country which is drained to the Gulf of Guinea, and extends from the Gambia River to the Niger. Many of the rivers which traverse this district are navigable for a short distance across the narrow coastal plain, but they suffer commercially from the fact that they discharge into lagoons nearly cut off from the sea by surf-beaten bars of sand. The approach to the sand-bars is rendered difficult by the continuous belt of surf always thundering against them, so that ships have to anchor about a mile away, and goods have to be transported to the coast in specially constructed native boats.

Mangroves.—The mainland shore of the lagoons is varied here and there by the deltas across which the rivers find their way by intricate channels, but it has a monotonous and gloomy aspect on account of the unvarying mangrove swamps which fringe it. At low tide the grey-white roots of the mangroves are left exposed, as well as the banks of foul-smelling black slime out of which they rise, for the rivers are heavily laden with mud ; but at high tide it is possible to traverse all the channels in a small boat. Many crocodiles live in this district, but few birds save parrots are seen, and few mammals save monkeys.

The Climate throughout the coastal belt is hot, equable, and very wet on account of the indraught of oceanic winds, which are forced to rise in front of the Guinea highlands, and thus to cool and deposit their moisture. In winter, however, the dry Harmattan frequently blows from the Sahara instead of the South-West Monsoon. The climate is so unhealthy that few Europeans can endure it many years, and Sierra Leone has been called ' the White Man's Grave.' A poisonous mist rises from the mud towards evening, and malarial fever and ague are always rife. The rich products of the region have, nevertheless, attracted many European traders, and support a dense negro population.

The chief products are palm-oil—of far the greatest value—rubber, ground-nuts, mahogany, ebony, bananas, and yams, which resemble potatoes, and form an important article of native diet. Cotton, coffee, millet, and maize are grown farther inland. A little gold still comes from the Gold Coast, and ivory from the Ivory Coast ; but slaves are no longer captured from the Slave Coast, and the spice-grains for which the Grain Coast was once noted have now little value.

Transport is difficult, though railways are beginning to be built. Products for export are collected at various trading factories built along the shore, and managed by European agents. Here they are exchanged for such imports as cotton goods, weapons, gunpowder, and the spirits which have so terribly demoralized the natives. These have also suffered much in the past from slave-raiding. Civilization is, therefore, at a very low level, and the majority of the inhabitants are pagans. Most of them live in villages of mud huts roofed with branches.

The British possessions along the Guinea Coast are the following : (1) **Sierra Leone,** a colony originating in a settlement of negroes, who were rescued from slavery by British philanthropists. The capital—**Freetown**—is unhealthy, but is built on a peninsula that renders the

harbour the most sheltered along the coast. A railway runs some wa inland from this point. (2) **The Gold Coast,** of which the capital i Accra. A railway goes from a landing-place at Sekondi to Kumassi– the capital of Ashanti behind. (3) **Southern Nigeria and Lago** (see p. 264).

To the French belong **French Guinea**, the **Ivory Coast,** an **Dahomey.** The Portuguese own **Portuguese Gambia,** and th Germans **Togoland.** **Liberia** is an independent Republic, started b an American society with the object of repatriating negro slaves. Th indigenous population near the coast belongs mainly to a tribe calle 'Krumen,' who are a fine, energetic race, and are therefore in grea request, not only as labourers, but as sailors on vessels carrying on a loca trade.

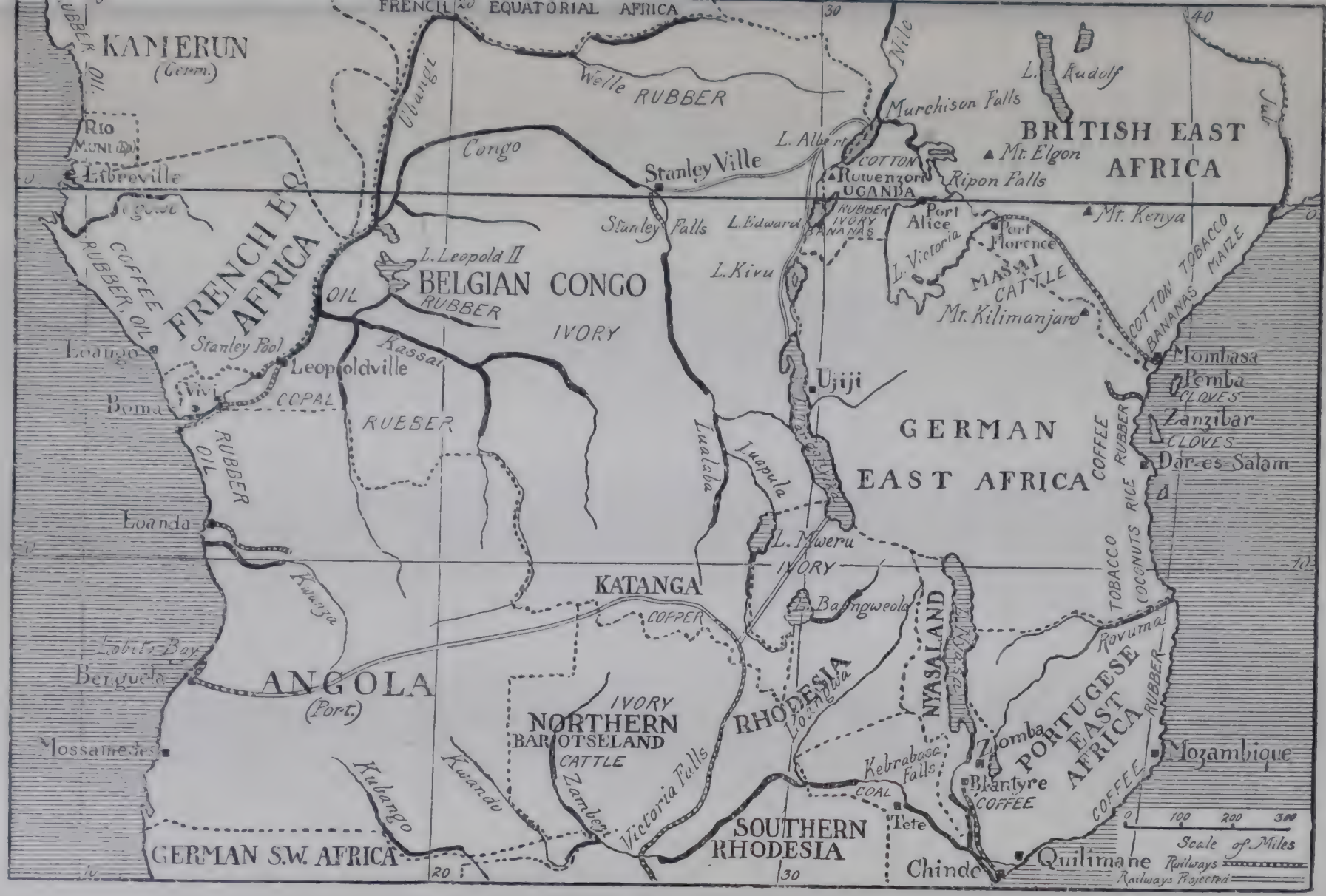
LOWER GUINEA.

From a physical point of view this belt of country is divided into a northern elevated tract of land between the Niger and Congo Rivers, which has a hot, we climate ; and a southern, elevated district, which is part of the South African table land, and has a cooler and drier climate. Both areas, however, descend steeply t narrow coastal plains, and are drained to the Atlantic. The chief commercial pro ductions of the seaward slopes—save in Southern Angola—are palm-oil and rubbe as well as coffee.

Kamerun is a German Protectorate, which has recently bee enlarged at the expense of French Equatorial Africa. At the head of th Bight is a group of volcanoes, called the Kameruns, which rise in Kameru Peak to height of 13,000 feet. All the volcanoes are extinct save on Vegetation varies with altitude, and changes from mangroves along th unhealthy shore to forests about half-way up the Kameruns, and gra above. Both cacao and coffee do well on the rich volcanic soil. Th exports in order of value are rubber, palm-kernels and oil, and caca The interior of the country is little developed as yet.

Of the **islands in the Gulf of Guinea,** Fernando Po and Annob belong to Spain, and Prince's Isle and St. Thomas to Portugal. **S Thomas** is the least unhealthy and most productive. Large plant tions of cacao, coffee, and cinchona-trees for quinine are cultivated indentured negro labour under Portuguese supervision. **Corisco–** low isle close to the mainland—and a small coastal territory, **R Muni,** belong to Spain, but have no harbour.

French Equatorial Africa.—The coast is fringed with ma groves, and forests cover the seaward slopes, many of the trees yieldi



MIDDLE AFRICA : POLITICAL AND ECONOMIC.

valuable wood for cabinet-making and dyeing. **The chief exports** a rubber, ivory, timber, palm-oil and kernels, and coffee. The princip port is **Libreville,** the present capital.

Portuguese Angola.—The coastal plain is deficient in rainfa and so is most of the interior, and hence the prevailing scenery is that a poor savanna or scrub-land. Oil and rubber are, however, obtaine from the forests on the seaward slopes in the north, and coffee and cotto plantations do well. **Loanda** is the capital of the country, and a rai way has been carried thence some way inland. It has a splendid harbou and so has **Lobito Bay,** just north of Benguela, from which a railwa is being built to Katanga—a copper-producing district in the south-eas of Belgian Congo.

ISLANDS IN THE SOUTH ATLANTIC.

The islands of St. Helena and Ascension in this ocean are of volcani origin. They have been taken possession of by the British to serve a places of call or refuge for ships. **St. Helena** has an equable, warm moist climate, and was once well wooded ; but most of the trees hav been destroyed. Since the opening of the Suez Canal its importanc as a coaling station has declined. **Ascension Isle** suffers from lac of sufficient rain. Its chief product is turtles, which come there in th spring and early summer to lay eggs.

BELGIAN CONGO.

This State is a low tableland which comprises the greater part of the basin o the Congo.

The Congo rises on the high eastern tableland, and in its uppe course, where it is called the Luapula, passes through the two shallo lakes of Mweru and Bangweolo. After this it is joined by a large navi gable tributary from the south—the Lualaba—which is considered b some to be the true head-stream. A little further on it is joined by tributary which forms an outlet to Lake Tanganyika, whenever th water in that lake stands at a sufficiently high level. Below this th river attains a breadth of about a mile, and is navigable to the Equato where the great Stanley Falls occur. Here it changes its direction fro northward to westward, and still further on to south-westward. I receives numerous tributaries, which are probably the remnants of great inland sea, and the main river resembles an elongated lake studde

with islands. For 1,000 miles it forms a magnificent deep waterway, but after passing Stanley Pool it plunges down a series of unnavigable rapids, and enters the deep estuary which forms its mouth. To avoid the rapids a railway has been built from the head of the estuary to Leopoldville near Stanley Pool.

Of the numerous tributaries the Congo receives, all have falls where they descend from the marginal tableland, but are navigable in their lower courses. Many of the left-bank tributaries unite to form the Kassai, and those on the right bank to form the Ubangi. The volume of water brought down by the rivers is so great as to create in places large lakes and vast swamps.

Climate.—The heat is great at all seasons, and thus—though the region lies in what is known as the belt of Equatorial calms—there is a constant indraught and ascension of air. The heat, moreover, increases evaporation, so that the air is moisture-laden and the rainfall heavy. Near the Equator, in fact, rain falls almost every day, often in thunder showers. As the heat belts shift north and south of the Equator with the seasons, a summer rainfall is brought in turn to regions on the northern and southern limits of its sway, and a double rainy season to those parts which are twice traversed by the belt. The length of the two rainy seasons, and the time between, vary with the latitude, and near the Equator the interval between them is shortest though most clearly marked.

Vegetation.—The moist atmosphere, combined with heat, supports a luxuriant vegetation, and near the rivers the foliage of the forests is sometimes so thick as partly to obscure the daylight. In many cases the trunks of the trees are hung with parasitic plants and interlaced with climbers, many of them armed with hooked thorns, which render it difficult to penetrate the forest.

Population.—Despite its gloom and unhealthy climate, the basin has a fair native population ; but it has been reduced by the slave traffic of the past and the cruelties attendant on the recent forced labour system. The slave traffic was mainly associated with the ivory trade carried on by the Arabs ; for the natives were captured and forced to convey the ivory—obtained both from elephants and hippopotami—to the coast free of cost, and were then sold. The forced labour system is chiefly associated with the rubber trade, organized by Belgian officials, and by it the natives were compelled to collect and bring into various

stations a certain amount of rubber every year (see p. 330). Some o the chief abuses of this system are now, however, being removed.

The great majority of the natives are negroes, who speak one of th Bantu languages which predominate over Southern Africa. In th most inaccessible parts of the forests, however, there dwells a race o undersized negroes, averaging 4 feet 3 inches in height, who have bee called Pygmies. Nearly all the negroes are heathen, but different tribe have attained to different degrees of civilization. They live chiefly o bananas, yams, maize, and other crops, grown in clearings on the edge o the forest, and dwell in huts made of stakes or reeds.

Bana is the capital and chief port of the State. By far the mos valuable **export** is rubber, others being ivory, palm-oil, palm-nuts, and kind of resin called ' copal.'

EAST AFRICA.

East Africa, south of the Abyssinian highlands and Somaliland, and north o the Valley of the Zambesi, consists of a tableland descending steeply to the narrow coastal plain on the east, and more gradually on the west to the basins of the Congo and Middle Nile.

THE COASTAL PLAIN.

Climate and Vegetation.—The temperature of this plain, from Somaliland to the Zambesi, is everywhere very hot, but while in the extreme north the rainfall is slight, it is heavy in the central portion The prevailing wind south of the Equatorial region is the south-east trade wind, but in the summer of the Southern Hemisphere the north-east trade-wind blows as far south as Zanzibar, and both winds blow more strongly inland, so that this is the rainy period (see p. 251). The eleva tions which border the African tableland behind the coastal plain serve to increase the rainfall over the plain, for winds have to rise in front o it. They reduce, however, the rainfall of the tableland in the west Similarly, Madagascar rather cuts off the rainfall from the mainland opposite. The white coral sand beach of the plain is backed in the north by barren lands, but elsewhere by mangroves, jungles, and tracts o cultivation in the clearings. The soil is rich, especially along the river valleys, which cross it, and yields good crops of rice, maize, and yams while there are also plantations of rubber-trees, bananas, coconut palms and mangoes. The fruit of the mango-tree is eaten, and the bark can be used in tanning.

The coast is politically divided between Britain, Germany, and Portugal. The capital of **British East Africa** is **Mombasa,** situated on a small coral isle, and connected by a bridge with the mainland. It has a deep harbour, and there is another near it which is the terminus of the State-owned railway from Port Florence, on Lake Victoria.

The Islands of Zanzibar and Pemba off the coast are under British protection, though they still form an Arab sultanate. Both are coral islands, largely devoted to the production of cloves—the flower-buds of a shrub. Unfortunately, large vessels cannot come close up to the shore at the roadstead of Zanzibar, which is on the west side of the island ; but it is, nevertheless, the chief depot for entrepôt trade along the coast. It is also a chief place for hiring the porters used to carry goods into the interior, for the tsetse-fly prevents the use of beasts of burden. Many caravans which start from this point consist of hundreds of men, each carrying goods to the weight of 60 to 100 pounds, and averaging about 10 miles a day, or more. They march in single file, as the roads are merely narrow paths.

In **German East Africa** the chief port is **Dar-es-Salam,** which has a good harbour. It is the capital of the colony, and the starting-point of caravans to Ujiji, on Lake Tanganyika, and to other places. **Mozambique,** on a small coral isle of **Portuguese East Africa,** has a good harbour, but its trade is small. **The chief exports** from all these ports are rubber, ivory, and coffee.

THE EAST AFRICAN TABLELAND.

Rift-valleys.—This tableland has been a good deal modified by great rift-valleys and vast outpourings of lava. The creation of the rifts was probably a gradual process, due to the formation, by means of earth-movements, of parallel cracks between which land has sunk down. The direction of the rift-valleys is indicated by the long, narrow lakes that lie in them, and is shown on p. 253. One rift-valley passes from the Red Sea south of the Abyssinian Tableland, and then turns southward to the east of Lake Victoria. Lake Rudolf lies in this valley, and Lake Nyasa occupies its southern portion. Another rift-valley runs west of Lake Victoria, forming the bed of Lakes Albert, Albert Edward, and Tanganyika, and then joins the eastern rift north of Lake Nyasa. The Lakes of Victoria, Bangweolo, and Mweru lie in depressions and not in

rift-valleys, but the Red Sea is a still larger rift-valley, and owes th straightness of its shores to this fact.

Volcanic activity was probably associated with the formation of the rifts, and out of vast rents or numerous vents in the crust of the eart must have flowed the sheets of lava which built up the high tableland Abyssinia, and covered parts of the tableland near the great lakes. Th high mountains of **Kenya** and **Kilimanjaro** and others in this distri are extinct volcanoes.

Differences in the relief of the land have caused differences in climate and veg tation, and the tableland can be subdivided into—(1) the eastern plateau and volcan uplands ; (2) the basin of Lake Victoria ; (3) the western plateau and Nyasaland.

THE EASTERN PLATEAU AND UPLANDS.

The plateau is somewhat barren, partly on account of the poo crystalline rock of which it is composed, and partly because the se winds have deposited most of their moisture before reaching the plateau and so are dry. The scenery is that of a scrub-land, and consists c thorny and gum-yielding trees and bushes, and stretches of poor grass land. Wild animals—such as antelopes, zebras, rhinoceroses, and lions— are numerous ; but the absence of good permanent pastures and th prevalence of the tsetse-fly restrict the rearing of live-stock and the use o horses. The population is scanty and nomadic.

The uplands, which are composed of volcanic rock, occur on both sides of the eastern rift-valley, and form the greater part of Masailand They include the extinct volcanoes of Kilimanjaro (about 19,000 fee high), Kenya (about 17,000 feet), and Elgon (about 14,000 feet). Th sides of the rift-valley are generally steep, and the floor is diversified by transverse ridges, which have created lake-basins between them.

Climate and Products.—The volcanic soil is fertile, and as th rainfall is promoted by the increased altitude, the vegetation is fa richer on the uplands than on the plateau. The climate on the upland is well suited for Europeans, and the scenery has been likened to that o our English Downs. The grass often grows to a great height, turning yellow when ripe, and as the tsetse-fly is absent here, large flocks o humped cattle, sheep and goats are reared, though recently the cattl have been reduced by a disease called 'rinderpest.' Cereals can also be cultivated on these uplands. Still higher, on the lower slopes of the mountains, are dense forests, where the trees are hung with creepers and

lichen. This type of forest merges into a zone of bamboos, above which the vegetation is remarkable for the tree-heaths, tree-groundsels, and giant lobelias; while the summits of the high peaks are crowned with snow.

Inhabitants.—The uplands are well populated, the most important natives being the **Masai,** a fine tribe physically, who speak a negro language, and are dark-hued. They are a pastoral people, and hence nomadic, and have been noted for their military prowess. The common diet of the men is milk and meat, but cereals, and honey obtained from wild bees, are also eaten. Their dwellings generally consist of skin stretched from a framework of poles, and thorny fences are constructed around their encampments for protection. Brushwood is used for bedding, and gourds for utensils.

THE BASIN OF LAKE VICTORIA.

Lake Victoria lies partly in German and partly in British territory. It has an area about equal to that of Scotland. Its shores are mostly gentle slopes covered with grass or forests, and in the south-west there are vast mud swamps covered with papyrus, which are the haunt of hippopotami and crocodiles. The surface of the lake near the shore is studded with isles, a few of which are inhabited by fishermen, for the lake abounds in edible fish Steamers ply regularly on the lake, but in spring and autumn it is subject to severe storms. The Nile forms rapids at its exit from Lake Victoria, and then expands into marshy lakes overgrown with reeds and water-plants. It finally descends by the Murchison Falls to Lake Albert, which is 1,000 feet below the level of Lake Victoria. The climate of the lake shores is rather unhealthy, and the only important places on it are **Port Florence,** the terminus of the railway from Mombasa.

The Protectorate of Uganda is that portion of British East Africa which lies between Lake Victoria on the east, Lakes Albert and Edward on the west, and the Nile on the north. The surface is diversified, and hollows filled with forests and reed-covered swamps alternate with hills, where European life is possible, and agriculture is carried on. In the west the snow-crowned range of **Ruwenzori** rises to a height of about 17,000 feet, and the same zonal arrangement of vegetation is seen on its slopes as on those of Kenya and Kilimanjaro.

Products.—One of the chief products of Uganda is the banana,

which not only provides the natives with staple articles of food and drink but is useful in many other ways. The leaves are used as thatch, the fibre for ropes, and the sap in manufacturing a sort of soap. Sugar, coffee, cotton, tobacco, millet, and indigo can also be grown with success, and the forests contain such valuable timber-trees as cedar and juniper. Cattle can be reared, though they are sometimes stricken with disease. Some ivory is still procurable from elephants, but all big game is decreasing. Iron is plentiful, and has long been worked by the natives, who are also skilled in making baskets, mats, pottery, and cloth woven from bark-fibre. Many of the natives profess Christianity, and they are an intelligent race. Lately they have been sadly reduced in numbers by the ravages of the 'sleeping sickness,' a disease which is found to be transmitted by the tsetse-fly.

THE WESTERN PLATEAU.

This plateau, like the eastern plateau into which it merges south of the basin of Lake Victoria, consists of mainly crystalline rock. Though the highlands of German East Africa, which lie between Lake Victoria and the rift-valley, enjoy, like Uganda, a fair rainfall and are fertile, much of the German territory is rather arid and of slight commercial importance. The western rift-valley lies near the western margin of the plateau, and is deepest in the north, where it is occupied by Lake Albert.

Lake Tanganyika, which occupies the valley further south, has a length of about 400 miles and a breadth of 20 to 50 miles. Its waters are blue and fresh, and its shores are, for the most part, flanked by steep cliffs overhung with luxuriant vegetation, though here and there a break allows of descent from the plateau to the lake. In one such gap stands **Ujiji** on a strip of beach, its flat-roofed, stone Arab houses being conspicuous objects among the conical, grass-built huts of the natives, and the mangoes, oil-palms, and bananas in the streets and gardens. It is a trading-station, though the slave-trade, of which it was once a great centre, has ceased, and the ivory trade has declined.

Eastern Northern Rhodesia and Nyasaland.—Depressions in the north-west of this area are occupied by the shallow lakes Bangweolo and Mweru, which are drained to the Congo by the Luapula. The southern shores of both these lakes are vast swamps. Though the vegetation is poor on the borders of German East Africa, most of the country is a fine, undulating grass-land, and the higher portions are

clad with forests, noted for the beauty of their tree-ferns. Millet, maize, and various root-crops are cultivated by the natives, who also rear goats and sheep. A good road, known as the **Stevenson Road,** after its originator, runs between Lakes Tanganyika and Nyasa, and steamers ply regularly on both lakes.

Lake Nyasa, which is about 350 miles long, occupies the southern end of the eastern rift-valley, and is drained to the Zambezi by the Shiré. Navigation on this river is interrupted by falls about midway, and the valley is not very healthy. The Shiré highlands, however, which lie east of the river, are healthy and fertile. Here coffee is largely cultivated, and tobacco and rubber plantations promise well. Many parts are covered with forests of conifers and bamboo. The mission station of **Blantyre** is well situated among coffee plantations on these highlands.

MADAGASCAR.

This island, which is 1,000 miles long, is separated from Africa by the Mozambique Channel. It consists of a coastal plain, broadest on the west, and a central tableland, which rises towards the east and terminates in a steep escarpment. The coast-line on the east is very regular, but on the south-east there are numerous long lagoons behind sand-bars, and on the north-west many inlets. Forests cover most of the lowlands and the eastern slopes, which receive a heavy rainfall from the south-east trade-wind. The cooler and drier tableland is chiefly a treeless moorland devoted to cattle-rearing, but rice is cultivated in the moister valleys, and forms the chief food of the people. All the large wild animals of Africa are absent, but the island is noted for its lemurs, which dwell in the forests and resemble small monkeys.

Population is densest on the tableland, where the natives belong to tribes of Malay or Polynesian origin, called Hovas, whereas on the lowlands, especially in the west, they are mainly negroid. The capital—**Antananarivo**—is situated on the healthy tableland. Commerce suffers from the absence of railways and good roads. **The chief exports** are rubber, gold, and hides. The island belongs to France.

The Islands of Réunion, Mauritius, and Rodriguez.—The climate is hot and wet, and the soil fertile, especially that of the first two, which produce large crops of sugar. Mauritius and Rodriguez belong to Britain, as do also the **Seychelles** further north, which export coconuts and tortoise-shell. Réunion and the Comoro Isles belong to France.

South Africa: Political and Economic.

SOUTH AFRICA.

Africa, south of the Congo Basin, consists of a tableland which rises towards the edge, especially on the east, and descends by terraces to a narrow coastal plain. The tableland is broken on the east by the valleys of the Lower Zambezi and Limpopo, and its surface is depressed in Bechuanaland. From a consideration of relief and drainage the area can be subdivided as follows: (1) The tableland of the Kubango and Upper Zambezi; (2) the plains of the Lower Zambezi and coastal Portuguese East Africa; (3) the arid western tablelands of Damara-Nama, the Kalahari Desert, and lower basin of the Orange; (4) the high eastern tablelands—*i.e.*, Southern Rhodesia, the provinces of Transvaal and Orange Free State: (5) the southern mountainous margins—*i.e.*, the provinces of Natal and the Cape of Good Hope. Politically the whole of South Africa belongs to the United Kingdom, save for the Portuguese colony on the east and the German Protectorate on the west.

Climate.—While the northern portion of this region lies within the Tropics, the southern is in the Temperate Zone. In most parts the temperatures shown on the maps on pp. 248 and 249 are somewhat reduced by altitude. The east coast is warmer latitude for latitude than the west, for winds reach the east shore across the warm Mozambique current, while the cold South Atlantic current washes the west coast. The prevailing wind is the south-east trade-wind, which brings rain, mainly in summer (*i.e.*, November to April), to the eastern districts. It loses most of its moisture in ascending the ranges which flank the tableland, and the western areas are dry, save in the extreme south-west, which is affected by westerly winds in winter—*i.e.*, May to October (see p. 251).

Exploration of the Coast.—Nothing was known in Europe of Southern Africa till the Portuguese, in the fifteenth century, began to seek for a sea-route round Africa to South-East Asia, that valuable region of silk and spices. They were urged forward in this work by one of their princes, called Henry the Navigator, but it was not till after his death that, in 1488, a Portuguese, named **Bartholomew Diaz,** first rounded the Cape of Good Hope, and sailed far enough east to leave little doubt of there being a seaway to India. The King of Portugal therefore considered the Cape to be a good omen, and gave it its present name. This route was traversed in 1497 by another Portuguese—**Vasco da Gama**—who rounded the south of Africa, and after passing Natal—so called because he sighted it on Christmas Day—skirted the east coast as far as Melindi, and then sailed across to India. Da Gama's ship was the precursor of many more, mainly Portuguese, during the fifteenth and sixteenth centuries, and Dutch, French, and British later. The Dutch founded Cape Town in 1652 as a convenient station on the route to the East, and the British captured it in 1806.

THE KUBANGO-ZAMBEZI TABLELAND.

Probably in former ages this area enjoyed a heavier rainfall than at present, and the Kubango system, which now terminates in shallow salt pools after passing through Lake Ngami, was then tributary to the Zambezi. Though the prevailing scenery is that of a rather poor savanna, varied by swamps, there are forests in the north and along the rivers, and the western portion of **Northern Rhodesia,** known as **Barotseland,** is largely a rich grazing area.

The Victoria Falls.—The Zambezi for some distance above the Victoria Falls is shallow, and, though a mile in width, is not navigable.

The falls, which are upwards of 400 feet in height, occur where the river traverses a sheet of basalt, in which it has eroded a narrow zigzag gorge, whose direction is probably determined by the presence of veins of weakness in the rocks. The descent of the wide river into the narrow fissure from which it emerges by this gorge causes the spray to ascend like columns of smoke, and gave rise to its native name, which means 'the smoke that thunders.' The falls can be reached by railway from Bulawayo in twenty-two hours, and the line, which is carried across the gorge just below the falls by a bridge $\frac{1}{8}$ mile long, has now been constructed as far north as it is shown on the map on p. 267.

PORTUGUESE EAST AFRICA.

Below the Victoria Falls the Zambezi is much obstructed by rapids, and descends through a narrow, rocky gorge to the plain of its lower course. Navigation is possible across this plain, but, on account of shifting sand-banks, only for shallow steamers. The plain is hot, unhealthy, and infested by the tsetse-fly, but produces mangoes and sugar near the delta. The delta is a swampy region overgrown by mangroves, and the distributaries of the Zambezi are obstructed by sand-bars and vegetation. **Chinde,** at the mouth of the most navigable branch, is now the chief port of the river. Further south is the port of **Beira,** which has a good harbour, but is unhealthy. It is the terminus of a railway from Southern Rhodesia.

The **Limpopo River,** which rises on the high plateau of the Transvaal and crosses the southern portion of Portuguese East Africa, is shallow, and, owing to rapids, of slight value as a waterway. Near its mouth is **Lourenço Marques,** on Delagoa Bay, which has an excellent harbour, and is the terminus of a railway from Pretoria. The total trade of Portuguese East Africa is small, **the chief exports** being rubber, sugar, beeswax, ground-nuts for oil, ivory, and a little cotton.

GERMAN SOUTH-WEST AFRICA.

This is composed mainly of the **Damara-Nama Plateau** and a sandy coastal plain. The whole area is deficient in rainfall, especially the coastal strip, and the chief occupation is the rearing of goats, sheep, and horses. The best harbour along the coast, **Walfisch Bay,** belongs to Britain, but just north of this is a roadstead called **Swakopmund,** from which a railway has been constructed to **Windhoek,** the capital

of the Protectorate. Most of the inhabitants are negroes, but in the south are tribes belonging to the Negrito branch of the Negro race, called **Bushmen** and **Hottentots** (see p. 291).

THE KALAHARI DESERT, BECHUANALAND.

Vegetation varies much in different parts and according to the season. In the south and east there are large tracts covered with good grass, and some parts are wooded ; but a good deal is only relieved from barrenness by patches of bush-shrub and the thorny, succulent plants characteristic of arid regions. One common plant—a sort of melon—provides a refreshing food for man and beast, and the bulbous roots and juicy leaves of many others are edible. Many wild animals manage to subsist in the area. Population is sparse, and most of the natives, who belong to a branch of the negro race called Bechuana, live by pastoral pursuits.

SOUTHERN RHODESIA.

This corresponds roughly with the portion of the high eastern tableland between the Zambezi and Limpopo. The surface is also much diversified by numerous small, isolated hills called '**kopjes.**' These hills resemble the tors of Dartmoor in being composed of blocks of granite, and sometimes have a very artificial appearance. The climate varies with the altitude, and only those parts above 4,000 feet are really suited for European life. The rainfall diminishes towards the west, and disastrous droughts sometimes occur. Much of the country is well wooded, and good pastures exist ; but the cattle have suffered from rinderpest, and the tsetse-fly haunts the lower valleys. The chief crops are maize, millet, sweet potatoes, and ground-nuts, but locusts have proved a serious drawback to agriculture. The economic importance of the country is due to its gold-fields, which lie chiefly between Salisbury and Bulawayo, to its coal-field near **Wankie,** and to its iron.

The northern part of the country is called **Mashonaland,** and the southern **Matabililand,** after the negro tribes who live there. Both live mainly by cattle-rearing, but the Matabili are more warlike, and often, in the past, raided the Mashona. The capital of Southern Rhodesia, **Salisbury,** is connected with the port of Beira by rail, as well as with Cape Town via Bulawayo. At **Bulawayo** the main line turns northwest to traverse the Wankie Coal-field and cross the Zambezi. The only important export from Rhodesia is gold,

PROVINCE OF THE TRANSVAAL.

The portion of the tableland which forms this country is crossed from east to west by certain ridges, the chief of which, known as 'Witwatersrand'—*i.e.*, White Water's Ridge—forms the divide between the Limpopo and Vaal Rivers, which bound the Transvaal on the north and south. The region is everywhere characterized by kopjes, and differences in the altitude and climate have resulted in marked variations of scenery in different parts. The surface, which is generally called the **'Veld,'** after the Dutch word meaning 'field,' may therefore be divided as follows: (1) **The Broken or Bush Veld** of the north and centre, which has a very diversified surface, and is well wooded. The climate is healthy, and in most parts the rainfall is adequate for agriculture. (2) **The Low Veld** of the east and valleys, which is hot and unhealthy, and where the vegetation is semi-tropical. (3) **The High Veld** of the south, which is over 4,000 feet high, and experiences a cold, dry winter and rather hot summer. Except in the east the rainfall is inadequate to the needs of agriculture, and the prevailing vegetation is grass, which grows to a great height. Life is therefore pastoral, save where mining centres have grown up, for the district is rich in gold and coal.

Minerals and Towns.—The richest gold-fields occur in the Witwatersrand area, generally known as the **'Rand,'** for which **Johannesburg** has become the great centre (see p. 334). Though the rainfall is somewhat deficient, there are, fortunately, subterranean supplies of water, which can be used for irrigation and mining operations. Coal is also obtainable not far off. **Pretoria,** the capital of the Transvaal, and the seat of Government of the South African Union, stands a little north of Johannesburg. It is connected with Lourenço Marques, the natural port of the country, by a railway passing by the rich Middelburg coal-field and **Barberton** gold-field. Near Pretoria there are some diamond-mines, and gold and diamonds are the only important exports of the country. The majority of the white inhabitants in the mining centres of the Transvaal and the Province of Orange Free State are of British origin, but elsewhere are found the descendants of Dutch immigrants, called Boers, who are generally farmers.

THE PROVINCE OF ORANGE FREE STATE.

This is a stretch of high veld between the Caledon and Vaal tributaries of the Orange. These rivers, like most in South Africa, flow at the

bottom of deep valleys, and are subject to sudden floods in summer, while they are nearly dry at other seasons. Thus they are themselves useless as routes, and form a serious obstacle to traffic in districts where bridges are rare. The strain due to crossing the fords—or drifts—in the rivers necessitates the large teams of oxen, horses, and mules used in drawing waggons across the veld—'trekking,' as it is generally called. The rainfall only suffices for pastoral pursuits in most parts. The capital —**Bloemfontein**—enjoys a central position, and is on the railway to Pretoria. Two railways enter the country from the east coast—one from Durban, via Ladysmith and Harrismith, and one from East London —but both routes entail steep ascents and descents.

BASUTOLAND.

This corresponds with the portions of the high veld between the Orange and Caledon Rivers. In the east it is very mountainous, and possesses the Mont-aux-Sources, where rise the Orange, Caledon, and Tugela Rivers, the last of which flows through Natal. The rainfall is good, and the soil fertile, so that large crops of maize, millet, wheat, and oats are produced, and stone fruits do well. Cattle are reared on the mountain-slopes, and poultry are numerous; but most of the forests have been cut down. The region is densely populated for South Africa, but almost entirely by natives, who dwell in stone huts thatched with grass.

THE SOUTHERN MARGINS OF THE TABLELAND.

These include the belt of land which rises in terraces from the sea to the Drakenberg, Stormberg, Nieuwveld, Roggeveld, and other ranges, which border the High Veld of the interior. The rivers which rise in this mountainous girdle descend by means of falls, and flow at the bottom of gorges—often called 'kloofs'—and as they also have sand-bars at their mouths, they are of no use as waterways. The **Orange River** is also useless for navigation for the same reasons, though the rains on the Drakenberg Mountains at its source supply it with a fair volume of water in summer.

The Natives, who far outnumber the whites, are commonly called '**Kafirs,**' save in the south-east, where the Zulus dwell. They dwell in huts, built of wattle and daub; and a collection of such huts, often arranged within a circular fence constructed of thorn-bush, is known as

a 'kraal.' Their staple occupation is cattle-rearing and growing maiz Many are employed as domestic servants or as labourers by th Europeans, who form the bulk of the population in the towns.

Political Divisions.—Politically, the area is divided into—Swaz land, which is under the control of the British Government; the Provinc of Natal, which includes Zululand, and the Province of the Cape of Goo Hope, which includes Colony Proper and the native territories of th Transkei, Tembuland, Pondoland, and Griqualand East, as well a Bechuanaland. In 1910 a Union of South Africa was established, com prising the Provinces of the Cape of Good Hope, Natal, the Transvaa and the Orange Free State.

PROVINCE OF NATAL

This country consists of a narrow coastal plain, a tableland slopin upwards towards the north and west, and the Drakenberg range, whic forms the western boundary. Two depressions in this range are utilize by railways—one by the line from Ladysmith into Orange Free State over Van Reenen's Pass, and the other from the same town into th Transvaal, over Laing's Nek—but both are over 5,000 feet. From th highest peak in the range—the Mont-aux-Sources—the Tugela descend to Natal by a famous waterfall, and then flows at the bottom of a pic turesque, wooded valley.

Climate and vegetation vary with altitude. The chief crop of the hot, moist, coastal plain are tea, sugar-cane, and wattles, the bar of which is used for tanning. Nearly all the labourers on these planta tions are Indian coolies, who have long resided in the country, and slightl outnumber the Europeans. On the cooler and drier tableland maiz and other cereals are grown, but most of the area is devoted to rearin cattle and horses, and still higher up only sheep and goats can be bred.

Towns.—Rich deposits of steam-coal are worked round **Dunde** and **Newcastle. Maritzburg***—the capital of the country—lie in a depression in the tableland, which obliges the railway which connect it with the port of Durban to ascend before the final descent to th coast is made. **Durban** has a good harbour in Port Natal, though it entrance requires constant dredging to keep it free from silt. **The chie exports,** excluding the gold which passes out from the Transvaal throug Natal, are wool, coal, sugar, bark, hides, and mohair.

* The original full name, 'Pietermaritzburg,' is now little used.

PROVINCE OF THE CAPE OF GOOD HOPE.

The Northern portion of Colony Proper is a healthy but rather arid tableland. The deficient rainfall necessitates the artificial storage of water, even for the rearing of live-stock, and makes agriculture almost impossible. It is difficult, unfortunately, to obtain water from the Orange River on account of the depth of the gorge in which it flows.

Minerals.—Population is naturally sparse, save where the occurrence of mineral wealth has invited settlement. The principal minerals found are copper, which is mined at **Ookiep** and sent by rail to **Port Nolloth,** and the diamonds of Griqualand West, for which **Kimberley** is the great centre. The diamonds were first obtained from the gravel of river-beds and surface soil; but since these supplies have been exhausted, mining operations have been necessary. Most are now found in a sort of conglomerate which fills up natural pipe-like cavities in the rock. The soil, which is a blue colour when first dug out, is exposed to the disintegrating effects of the weather until it is pulverized or crumbles to dust, and the diamonds can then be washed out. Most of the diamond companies have amalgamated to form one, called 'De Beers.'

The southern portion of this Colony is divided by the ranges which run east and west, bordering the ascending terraces, into three belts: the Coastal Plain; the Little Karroo, between the Lange Bergen and Zwarte Bergen; and the Great Karroo, between the Zwarte Bergen and Nieuwveld. In the south-west the ranges change their direction, so as still to run parallel with the coast—*i.e.*, the Roggeveld, and the ridge which ends on the north in Table Mountain, and on the south in the Cape of Good Hope. This ridge has been reduced to a peninsula by the encroachments of the sea upon the valley behind, forming Table Bay in the north and False Bay in the south.

The South Coastal Plain.—The coast-line is diversified by a succession of promontories, formed by the eastern ends of the ranges which run east and west; but the bays thus created between them are of little commercial value, for the strong currents tend to silt up the harbours. The best is Algoa Bay, on which **Port Elizabeth** stands, and this has a good harbour; but the prevalence of strong south-east gales makes it difficult at times for ships to approach the land in safety, especially by day, when sea-breezes are strongest. The port is connected with the interior by a line which joins the main Cape Railway at De Aar.

Further east along the coast lie **Port Alfred** and **East London,** neither has a good harbour. The chief export from all these ports is wo

The Karroos.—These terraces resemble brown, stony plains, dott over with a few scrubby bushes, and relieved here and there by t flat-topped kopjes, which owe their tabular appearance to the horizon arrangement of the strata. The charm of the Karroos lies in th silence and vastness, the invigorating nature of their air, and their beau ful atmopsheric effects, especially at sunset. Though grass and flow are little in evidence, save for a short time after the rains, the sma deep-rooted Karroo bush affords food for many flocks. The chief occup tion is rearing merino sheep and angora goats ; but with the aid of ir gation agriculture is possible in the **Oudtshoorn** district of the Lit Karroo, and here grow tobacco, and the lucerne on which ostriches a reared in large numbers. **Graaff Reinet,** in the east of the Gre Karroo, is a great centre for collecting wool.

The Cape Town District.—This area lies far enough south be reached by the westerly winds in winter—*i.e.*, May to October—wh these winds extend furthest north, and has a Mediterranean type of clima with mild, wet winters and dry summers. It is noted for its win wheat, and stone fruit, and is also famous for its beautiful heaths, ar lilies, geraniums, and orchids, many varieties of which are cultivat for sale. It is overlooked by **Table Mountain,** which is composed horizontal beds of hard sandstone capping a granite base, and is app priately named from its apparently flat top, as seen from below. The ma torrents which rise on this mountain have seamed its slopes with de ravines, filled with luxuriant vegetation ; and over its top there frequen floats a cloud, known locally as ' the table-cloth.' Table Mountain ri to a height of 3,500 feet, and in front of it lies **Cape Town,** capital of the Province of the Cape of Good Hope, and seat of Legislat for the Union of South Africa. Cape Town has an excellent harbo and, save for the remains of the picturesque old Dutch quarter, consi of wide, regular streets, flanked by fine modern buildings, and plan with trees. It is connected by rail with the naval station of Simo Town, on False Bay, and is the starting-point of the ' Cape to Cai railway which it is proposed to carry across the continent.

Exports.—The most valuable export from the Cape is the g sent from the Transvaal. Other exports, of local production, diamonds, wool, ostrich feathers, mohair, hides, and copper-ore.

AFRICA—REVISION.

RIVER-SYSTEM.

The rivers of Africa may be classified as follows :

1. **Those flowing into the Mediterranean.**—All these are short and unnavigable, save the **Nile,** which rises in Lake Victoria at the Equator.

2. **Rivers flowing into the Atlantic.**—No important rivers enter the Atlantic from the Sahara ; but south of this are the **Senegal** and **Gambia,** which are navigable for small vessels for the lower part of their courses. Near the source of these rivers rises the **Niger,** which flows into the Gulf of Guinea after a circuitous course. It is navigable for most of its course, but suffers from rapids above Rabba. South of the Gulf of Guinea the chief river is the **Congo,** which is a magnificent waterway save for interruptions at Stanley Falls and near Stanley Pool. It brings down a greater volume of water than any other African river. Still further south is the **Orange** River, which is not navigable.

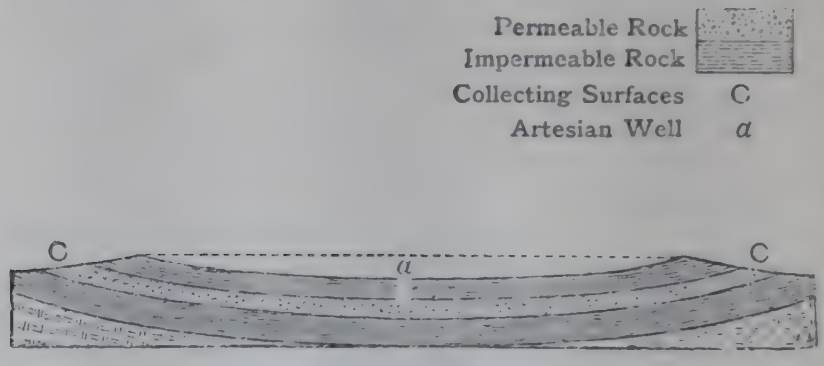
3. **Rivers flowing into the Indian Ocean.**—The chief rivers are the **Limpopo** and **Zambezi.** Navigation, though possible on both for some stretches, is much interrupted by rapids and falls.

4. **Areas of inland drainage** occur in the Sahara and part of the Atlas region, in the Kalahari Desert and its neighbourhood, and in the Eastern Horn of Africa.

Wells.—In all these areas of scanty water on the surface there exists a certain amount of underground water, which in many parts can be reached by sinking wells. The supply thus obtainable varies in different places, and as it, too, ultimately depends on the rainfall, cannot be regarded as inexhaustible, though it may have travelled underground a great distance from regions of heavier rainfall. In the case of some wells, called **Artesian,** the water is forced up the shaft by natural pressure, instead of requiring the usual artificial means to raise it. This occurs when the strata of porous rock along which the water filters are bent in a basin form, and overlaid, as well as underlaid, with non-porous strata, save at the surfaces where the water enters. The water, therefore, accumulates in the basin, and, if a shaft is sunk, will rise to the level of saturation of the strata, which may be the surface of the land where the well is made, or even above it (see p. 286)..

The Lakes of Africa may be divided into—(1) Those that lie in the

eastern rift-valleys—*e.g.*, Lakes Rudolf, Albert, Edward, Tanganyik and Nyasa. (2) Those occupying depressions in the eastern tablela —*e.g.*, Lakes Victoria, Bangweolo, and Mweru. (3) Those in the ar



ARTESIAN WELL.

inland drainage areas—*e.g.*, the saline shotts of the Atlas region, Lak Chad, which is fresh, and Lake Ngami, which in some seasons is fres and some brackish. (4) Lagoons, which occur along the Guinea Coas near Port Said, and in some other coastal districts.

CLIMATE AND VEGETATION.

Africa can be divided into the following climatic areas * :

1. **The Atlas region** and **Cape Town area**. Both of thes districts have mild winters, during which they receive rain fro westerly winds, and hot, dry summers. The winter season of the Cap Town area falls during May, June, and July. The vegetation therefore of the **Mediterranean type** (see p. 109).

2. **The Sahara** and **Somaliland** in the north, and **Kalaha Desert** and **German South-West Africa** in the south. In all the areas the temperature is extremely hot in their respective summers, ar fairly hot at all seasons by day. The nights are, however, quite cool at time The areas lie in belts of high atmospheric pressure, from which air ten to move outwards. They are beyond the reach of the westerly wi belts at any season, and easterly winds will have been robbed of moistu by lands further east before reaching them, save in the case of Soma land. Here the winds are north-east in winter and south-west in summ but deposit little moisture, as they blow parallel with the coast. A these regions, therefore, suffer from drought.

Desert Vegetation and Scrub.—Even in the most arid regio it is rarely possible to travel far without meeting some deep-roote succulent or prickly plants, adapted to withstand the drought ; or veget

* For maps, see pp. 248, 249, 251, 327, 329 ; and for statistics, p. 345.

tion supported by subterranean supplies of water, as the date-palms in the oases of the Sahara. Wherever irrigation is possible, as in the Nile Valley, valuable crops can be grown. Along the margins of the deserts are poor grass and scrublands, where thorny bushes are common.

3. **The Sudan, the East African Tableland, and the Kubango-Zambezi Tableland.**—The temperature is generally very hot, though reduced by altitude on the tablelands. The rainfall is fairly heavy, and falls mainly during the respective summers of the areas. In the east it is due to the south-easterly trade-winds, and elsewhere is the result of the seasonal shifting of the Equatorial belt of heat and low pressure and consequent indraught of air.

Savannas.—The characteristic scenery is the mixture of grass and woodland, called savannas. The trees are dense only along the river-courses, and elsewhere grow in clumps, giving a park-like aspect to the scene. One of the commonest is the baobab, which somewhat resembles an old-oak, save that its trunk is composed of soft, spongy wood, which acts as a reservoir, and that it loses its leaves in the dry season. Much of the region is well suited for cultivation, and millet, wheat, maize, cotton, coffee, and other crops are grown in parts.

4. **The Congo Basin, Upper Guinea, and Coastal Plains of Tropical East Africa.**—The temperature is very hot at all seasons, and the rainfall is heavy, for the heat increases evaporation and creates an indraught by constantly rising. As the heat and rain belts shift north and south of the Equator with the seasons, a summer rainfall is brought in turn to regions on the northern and southern limits of its sway, and a double rainy season to those parts which are twice traversed by the belt. Near the Equator some rain falls nearly every day. The climate is unhealthy for Europeans in many parts.

Forests.—The prevailing vegetation consists of tropical forests, which are extremely luxuriant and difficult to penetrate on account of the interlacing creepers and parasitic plants. The trees are evergreen, and the thick foliage partly shuts out the daylight, and gives the forests a gloomy aspect. Along the low coasts the prevailing trees are mangroves, the roots of which are partly above the ground, but covered with water at high tide. The trees of most economic value in the tropical forests are the palms, from which oil is obtained, mainly grown along the Guinea Coast ; the trees and creepers which yield rubber, notably those of the Congo Basin ; and the banana, the fruit of which is an important article of native diet in some parts.

Besides the tropical forests, there exist temperate forests on th eastern slopes of the ranges in South-East Africa and in Abyssinia, bu they are less luxuriant, and some of the trees are deciduous.

FAUNA.

The Sahara has proved so complete a barrier to the dispersal of anim life in Africa that it forms the division between two great zoologic provinces (see p. 331). North of it lies the **Palæarctic,** which includes th whole of Europe and North Asia, as well as the North African seaboard and south of it the **Ethiopian,** which extends over the rest of the con tinent. The fauna of the northern seaboard, in fact, very much re sembles that of Southern Europe, while that of the Sahara is transitiona in character and scanty in quantity. Domestic animals have bee introduced into both provinces wherever conditions are suitable, as we as into the Sahara, where the camel has proved of extreme value o account of its being so marvellously adapted to desert life.

The wild animals of the Ethiopian province can be subdivided into—

1. **Animals of the Scrub, Grass-lands, and Savannas.**—Among the most characteristic groups of animals in these areas are th antelopes, which include such varieties as the gazelle, hartebeest, gnu springbok, etc.; but there are no deer. There are also such large herb vorous animals as the giraffe, zebra, and hippopotamus—all peculiar t Africa—and the rhinoceros, which is only found elsewhere in the Orient province of South-Eastern Asia. The African elephant lives chiefly o roots and branches of trees, and differs from the Asiatic species in havin larger ears and longer tusks. The average weight of a pair of tusks of a African male elephant is 80 to 120 pounds, and single tusks have bee obtained weighing over 200 pounds. It is, therefore, more valuable as source of ivory than the Asiatic elephant, but has not been domesticate Carnivorous animals are numerous, and include the lion, hyena, jacka leopard, and panther, but the tiger is not found here.

Of birds, the largest is the ostrich—still wild in a few parts, but al reared on farms in South Africa for the sake of its feathers. Reptil abound, and the rivers in most parts are infested by crocodiles. Insec are also prolific, and some are regular pests—*e.g.*, the locusts, which times devour all the vegetation in a district; the tsetse-fly, whose bite fatal to horses, cattle, and dogs; and the white ants or termites, whi

destroy everything not made of metal, stone, or the hardest timber. These ants rear very high earth-heaps for the nurseries of their young.

2. **Animals of the Tropical Forests.**—These forests form the home of numerous species of monkeys and of the man-like apes—the gorilla and chimpanzee. Though many animals from the surrounding savannas penetrate the more open parts, and hippopotami abound in the rivers, the forests where densest are rather devoid of large animal life. The birds include many varieties of parrot, and in the lower swamps are swarms of mosquitoes—some species of which have been proved to aid in spreading malarial fever.

3. **Animals of Madagascar.**—These are chiefly varieties of lemurs, which resemble small monkeys, and live in trees.

RACES.

The two great racial divisions to which the inhabitants of Africa belong are the Caucasian and the Negro. The Caucasian is sometimes called the white, and the Negro the black race ; but the members of both groups exhibit a variety of shades, the prevailing hue of the Caucasians inhabiting North Africa being olive, and of the Negroes, who form the chief population south of the Sahara, various shades of brown (see p. 291).

The Caucasian Races in Africa include—

1. **The Arabs,** who are descended from Semitic tribes which have immigrated from Arabia at various times, among them the Saracens. These Arabs now form the upper class in the towns of Morocco, Algeria, Tunis, and Abyssinia. There are also a number of nomadic Arabs called '**Beduins,**' who roam over parts of the Sahara, and are subject to a despotic form of tribal government. All the Arabs are Mohammedans.

2. **The Hamites,** which include the **Berbers,** who form the bulk of the population in Morocco and Algeria ; the Fellahin, or peasants of Egypt ; and some tribes inhabiting the Sahara—as the **Tuareg.** The Hamitic races differ from the Arabs in having less elongated faces, but intermarriage has in parts nearly obliterated the distinction. Though Mohammedans, they are said by some writers to be less fanatical than the Arabs, and their type of government is more democratic.

3. **Europeans**, who have settled on the continent, and their descendants—*e.g.*, the **Boers,** who are descended from Dutch colonists in South Africa, and many of **British** origin, also in South Africa. Save in South Africa, and at a few places along the Mediterranean seaboard,

the Europeans in Africa are mainly only temporary residents—*i.e.* officials, traders, or missionaries.

The Hamitic and Arab races in some parts have modified the Caucasian traits by intermixture with negro races—as in the case of the Abyssinians, the Nubians, and the Somali, who inhabit the Eastern Horn of Africa. All these races have features of Caucasian type and a fine physique, but rather a dark hue—very dark in the case of the Nubians.

The Negro Races.—The characteristic traits of the negro race are the black, curly or frizzly hair, broad noses, thick lips, and dark eyes and hue ; and the races that exhibit these traits in the most marked degree are those inhabiting Western and Central Sudan. Here the colour of the natives is nearly black, but elsewhere it is varieties of brown. Most of the negroes are pagans, but some of the Sudan tribes have adopted Mohammedanism—*e.g.*, the **Fula,** who dwell chiefly along the Upper Niger, and the **Hausa** of Northern Nigeria.

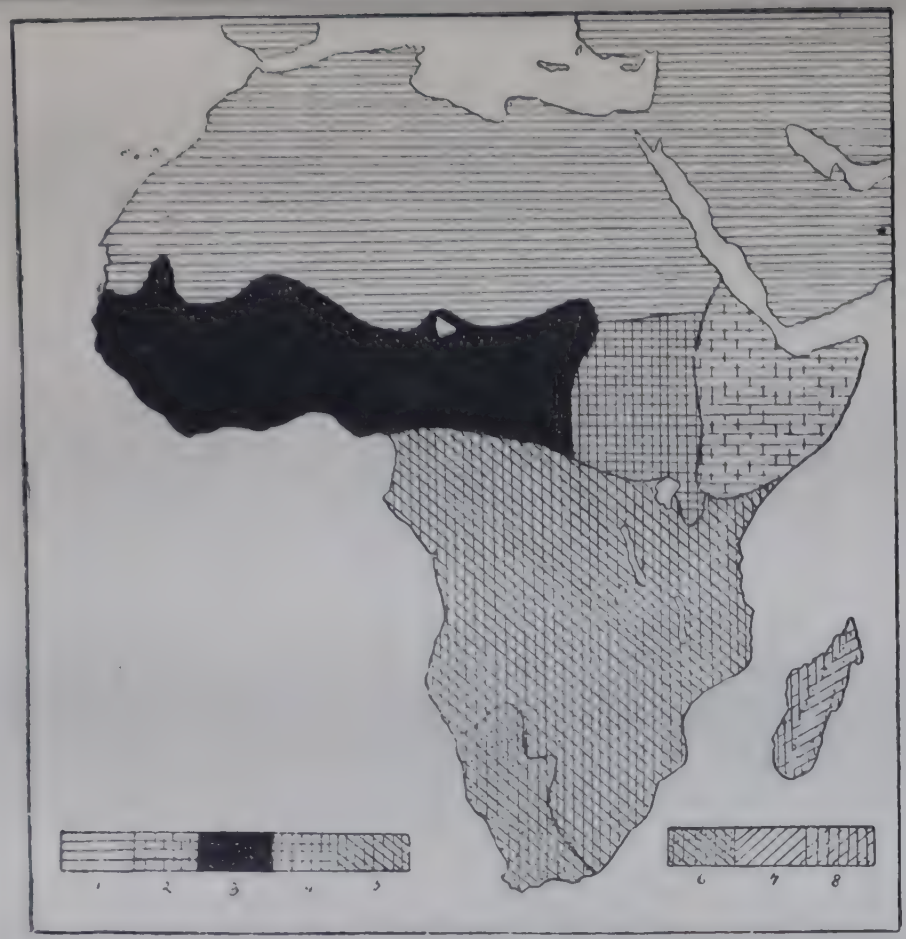
Many languages are spoken by the negroes of Western and Central Sudan, but those who dwell around the Upper Nile speak languages which are closely allied. So also do nearly all the tribes inhabiting Africa south of a line drawn from the Gulf of Guinea to Lake Victoria, and these have, in consequence, been grouped together and called **'Bantu.'** Both the Nilotic and Bantu negroes show evidence of a slight Caucasian strain, but the various tribes composing these groups differ very much in appearance. The finest examples of the Bantu group are the **Zulu** of South Africa, but their language is an exception to the general type. The term **Kafir** is loosely applied to the remaining tribes of the Bantu group in South Africa.

In the forests of Central Africa there dwells a race of negroes, averaging 4 feet 3 inches in height, who have been called **Pygmies.**

The Negrito Race is a branch of the negro, and includes the **Bushmen** and the **Hottentots.** These races inhabit parts of South West Africa, but are now numerically few. Both are of short stature—the Bushmen averaging only about 5 feet in height—and have a yellowish brown hue, and hair which grows in isolated tufts.

Some of the inhabitants of Madagascar seem to resemble the inhabitants of Malay, who come of Mongolian stock, or the Polynesians, who are a branch of the Caucasian race, rather than the negroes. They are called Hovas.

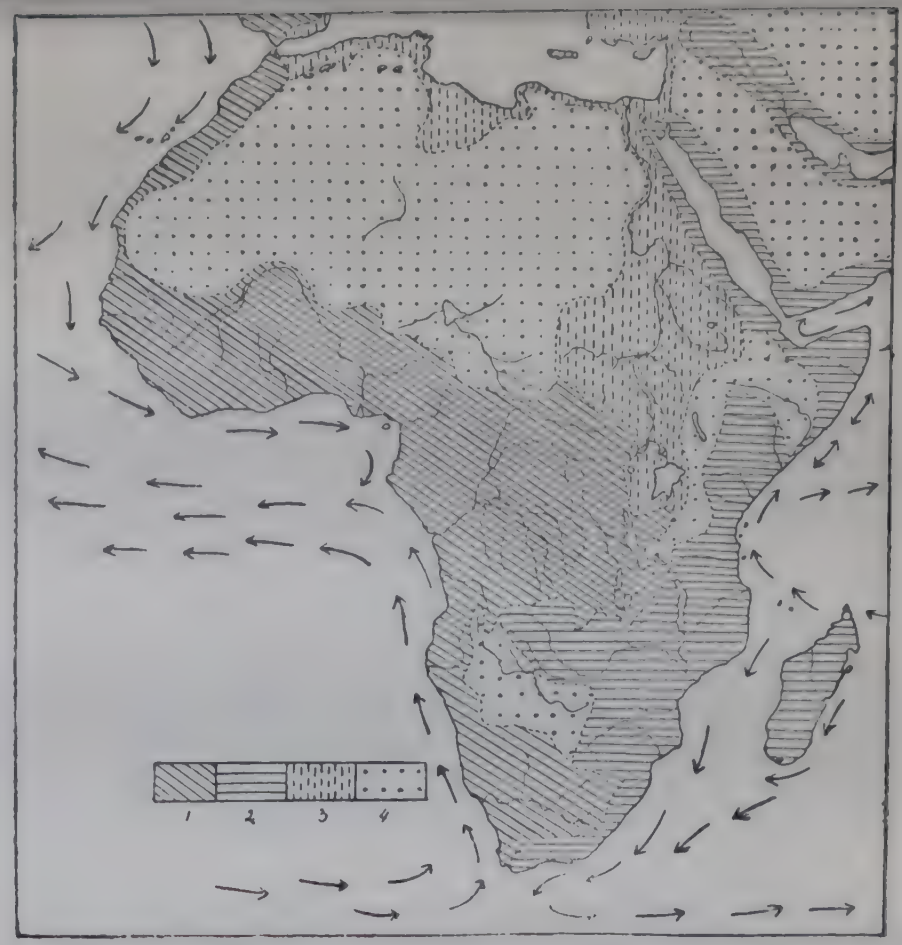
For map showing the distribution of population, see p. 335; and for statistics p. 349.



AFRICA: RACES.

(After Sir H. H. Johnston and Dr. A. H. Keane.)

1. Caucasian—Hamitic and Semitic. 2. Caucasian mixed with Negro—Abyssinians, Galla and Somali. 3. Typical Negro. 4. Nilotic group of Negro. 5. Bantu group of Negro. 6. Negrito—Bushmen and Hottentots, as well as Bantu. 7. Hova. 8. Malaysian or Polynesian mixed with Negro.



1. Land drained to the Atlantic.
2. ,, ,, ,, Indian Ocean.
3. ,, ,, ,, Mediterranean.
4. Areas of inland drainage.

⟶ = Direction of currents. (After the Diagram Co.)

AFRICA: RIVER SYSTEM.

AUSTRALIA.

ITS POSITION, SHAPE, AND DISCOVERY.

THE word **Australia** means 'the southern land,' and the continent i almost bisected by the Tropic of Capricorn. The isolation of Australi accounts for the late date at which its existence became definitely know to the civilized world. Probably it was first sighted at the close of th sixteenth century by the Dutch and Spaniards, who traded with th East Indies; but it was not till after the voyage of the Spaniard **Torres** in 1606 through the strait that bears his name that exploration began The Dutch then made many expeditions along the north and north-west coasts, and in 1642 the Dutch East India Company despatched a man named **Tasman** to find out the extent of this southern continent. He sailed from Batavia to Mauritius, and then south-eastward till he sighted the land now called Tasmania, after him. This island he took to be part of the mainland. Still sailing eastward, he discovered and named New Zealand before he returned to Batavia.

The next important discoveries in these seas were due to **Cook**, who was sent out by the British Government. In 1769 he sailed to Tahiti —one of the Polynesian Isles—and thence to New Zealand, where he circumnavigated both large islands, and passed through the strait that bears his name. Thence he sailed westwards, and landed in Australia at Botany Bay, which he thus named on account of the number of flowers he found. Then he sailed northward, skirting the land which he called New South Wales, but was nearly wrecked on the **Barrier Reef**. This reef is of coral formation, and extends for over 1,000 miles off the coast of Queensland, fringing the edge of the submarine plateau here and lying from 30 to 75 miles from the shore. The width of the reef is 100 miles at the widest part, and the top is level with the surface of the sea at low tide. There is always a belt of thundering surf along its oceanic edge, but the waters between it and the mainland form a comparatively calm passage commonly used by steamers and sometimes by sailing-ships, but the latter are in danger of being driven upon the reef on dark nights, and so generally sail outside. The reef is broken in several places by channels, through which vessels can pass.

Some time after Cook's voyage the British Government determined to utilize Botany Bay as a convict station, and this led to the foundation in 1788 of Sydney on Port Jackson, the fine inlet immediately to the

1. Lowlands composed of very recent rocks and deposits, including some older rocks in Western Australia.

2. The great plains of East Central Australia, composed of sedimentary rocks of fairly recent epochs.

3. Highlands composed of old sedimentary and crystalline rocks.

4. The Western Plateau, also composed of old sedimentary and crystalline rocks, mainly the latter.

AUSTRALIA: STRUCTURAL DIVISIONS. (After J. W. Gregory.)

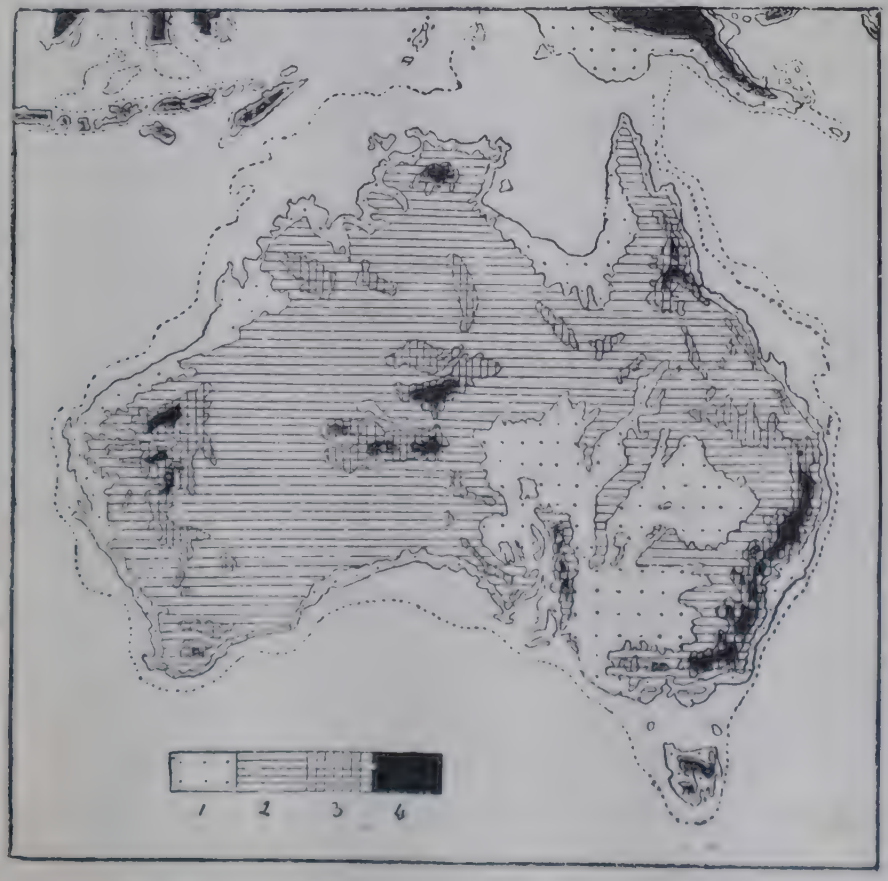
1. Under 600 feet high.

2. 600 to 1,000 feet high.

3. 1,500 to 3,000 feet high.

4. Over 3,000 feet high.

— Hundred-fathom line.



AUSTRALIA: RELIEF. (After the Diagram Co.)

north. A few years later **Mr. Bass** and **Mr. Flinders,** two of officers on board a ship sent out to this settlement, undertook the w of exploring the coast to the south. In one of their voyages th circumnavigated Tasmania, and this explains the name 'Bass Stra In another voyage Mr. Flinders sailed along the south coast eastwa round the Great Australian Bight, past the Gulfs of Spencer and Vincent, to Port Philip.

Thus, by degrees, the size and shape of Australia became known ; t the absence of great inlets or river routes into the interior, the des nature of much of the western coast, the wall of cliffs bounding t Australian Bight, the Barrier Reef on the north-east, and the highla behind the east-coast plain, retarded the exploration of the interior the continent, and some parts are still almost unknown.

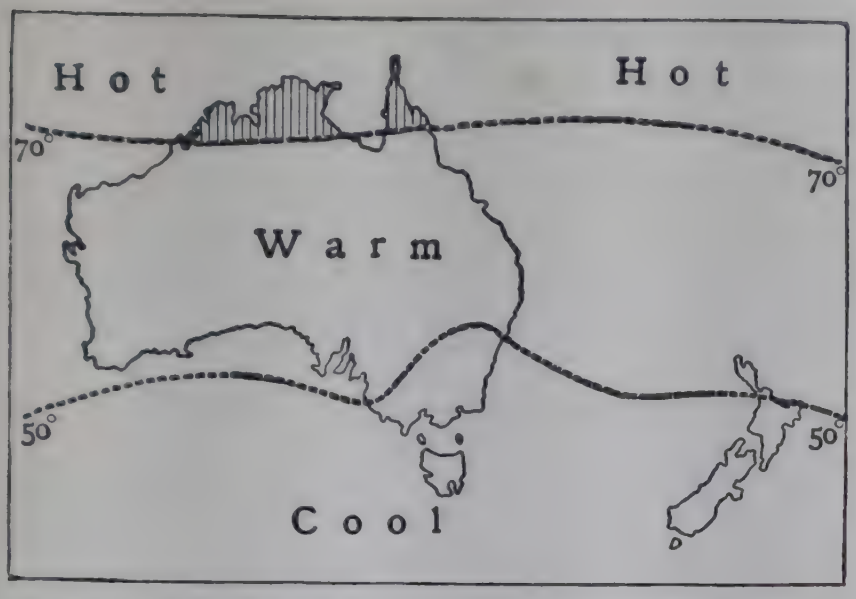
RELIEF AND POLITICAL DIVISIONS.

On account of its relief Australia can be broadly divided into th regions : (1) A low western tableland bordered by plateaus ; (2) a mid belt of lowlands, including the basin of the Murray, Darling, and t areas drained to Lake Eyre and the Gulf of Carpentaria ; (3) the East Highlands.

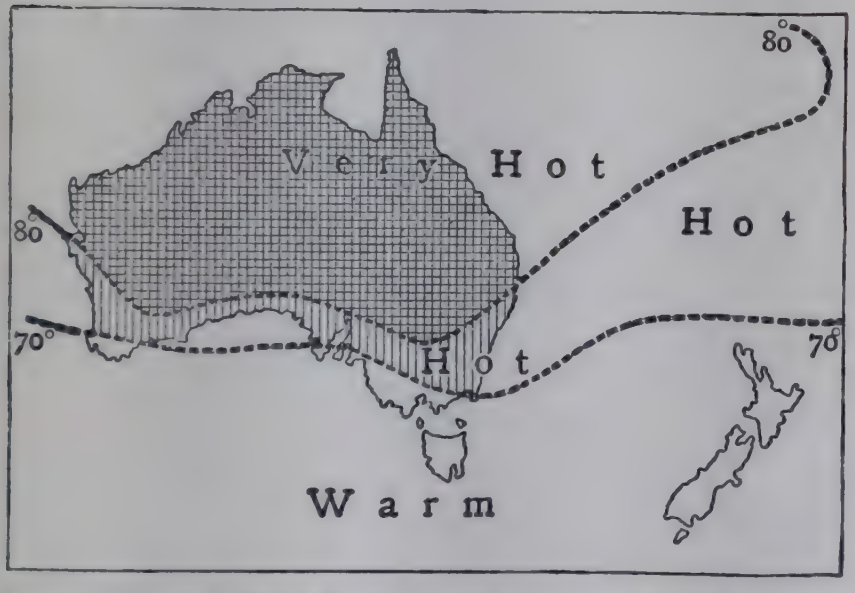
Politically this continent is divided into the five States of New Sou Wales, Victoria, Queensland, South Australia, and West Australia, a these, with the Northern Territory and the State of Tasmania, ha been united to form the Commonwealth of Australia. The Fede Parliament meets for the present at Melbourne, but Yass Canberra, one of the upper tributaries of the Murrumbidgee in New South Wal has been selected as the site of the federal capital. The powers of t Federal Parliament are chiefly confined to determining taxes and Custo house duties, the system of naval and military defence, and pos arrangements.

THE DESERT WESTERN TABLELAND.

This stretches over the interior of Australia west of a line from t Gulf of Carpentaria to Spencer Gulf. Save for the Nullabor limest plains in the south, it is chiefly composed of crystalline rocks, and w formerly overlaid by horizontal layers of sandstone. The gradual acti of erosion has, however, completely destroyed the sandstone measu in some places, laying bare the rocks below, while in others it has redu



AUSTRALIA AND NEW ZEALAND: ISOTHERMS FOR JULY.



AUSTRALIA AND NEW ZEALAND: ISOTHERMS FOR JANUARY.

them to vast stretches of sand diversified by a few flat-topped hills and pillars which are the remnants of the original sandstone capping.

Climate.—The average temperature is high, but there are great differences in the temperature of summer and winter and day and night, for no sea winds moderate the range. The area lies in the belt of high atmospheric pressure, from which air tends to flow outwards. It is too far north to be affected by the westerlies at any season, and easterly winds will have lost their moisture long before reaching it. The rainfall is therefore very slight, and the area is one of inland drainage (see pp. 327 and 305). The rivers are mere wadis, which exist for a short season and terminate in shallow saline lakes or marshes. The largest

lake on the tableland, Lake Amadeus, which lies between two series of ranges running east and west, is often only a sheet of salt.

Vegetation.—Vast areas are hopelessly barren, and the rest is mainly covered either with tufts of the tall, coarse spinifex grass, which is hated by all travellers on account of its sharp edges, or dense thickets of scrub. In some places the salt-bush thrives, on which sheep can feed, and in a few districts there are poor pastures.

THE STATE OF WESTERN AUSTRALIA.

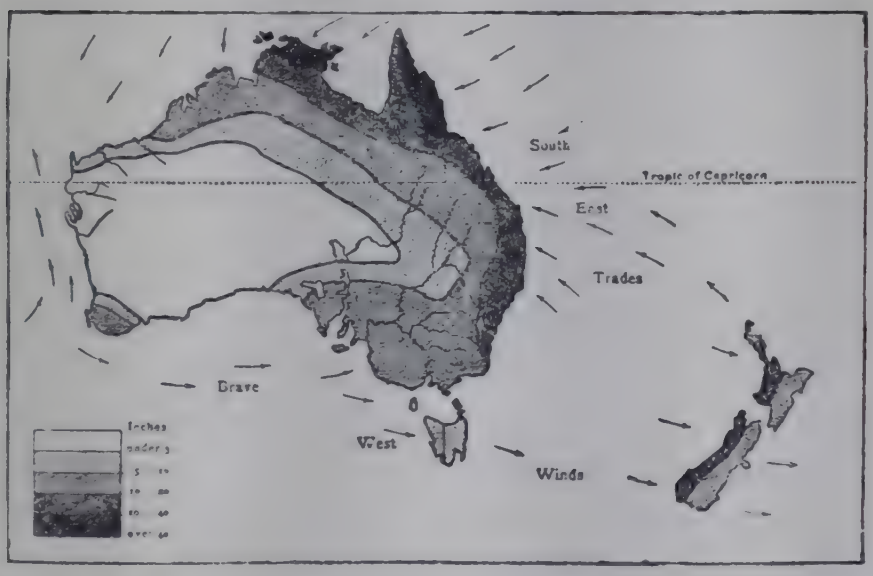
This consists partly of the deserts already described, and partly of a coastal plain and series of marginal plateaus, which are described below.

Climate and Vegetation.—The temperature is hot, but diminishes towards the south. Some rain is brought to the north by monsoonal winds in the hot season (November to April), and to the south-west by westerly winds in the cool season (May to October) (see p. 297). The central portion is, however, deficient in rain, and thus several of the rivers which rise on these plateaus and flow to the Indian Ocean are at times mere pools. The prevailing scenery is of a poor grass and scrub-land, save in the south-west, where there are magnificent forests. Among the trees are two tall species of eucalyptus, called karri and jarrah, which yield a hard red wood of great value as timber. The vine, wheat, and other products that grow in the Mediterranean also flourish in the south-west, for the climate is similar.

Animal and Mineral Productions.—Cattle and sheep are reared in some parts on grass and salt-bushes, and pearl-fishing is carried on all along the coast from Shark's Bay northwards ; but the chief wealth of Western Australia lies in its gold. The most productive fields at present are those of **Kalgoorlie** and **Coolgardie,** which are connected by rail with Perth. As the local water-supply was inadequate, pipes have been laid to convey water thither from the seaward edge of the plateau. Other very profitable fields exist at Mount Margaret and Murchison, and, in fact, at intervals all the way northwards to the Kimberley division (see p. 334). A little coal is mined near Bunbury.

Towns.—Perth the capital of Western Australia, is situated on the Swan River, and has an excellent port in **Freemantle**, at the mouth of the river. **Albany** is a naval station, which has a splendid harbour, on King George's Sound. **The chief exports** of Western Australia are gold—by far the most important—timber, wool, and pearls.

AUSTRALIA AND NEW ZEALAND: WINDS AND RAIN, MAY TO OCTOBER.



AUSTRALIA AND NEW ZEALAND: WINDS AND RAIN, NOVEMBER TO APRIL.

MIDDLE AUSTRALIA.

THE NORTHERN TERRITORY.

This includes, besides part of the desert table already described, the Arnheim peninsula.

The Arnheim peninsula projects northwards between the Gulf of Carpentaria and Cambridge Bay. The climate is hot and moist in the north, the rainfall decreasing towards the interior. Most of the rain

comes in the hot season, when winds are drawn inwards to the heated interior. The seaboard is clad with forests, and the shore in places is fringed with mangroves. Tropical products could be grown here if suitable labour were obtainable. The interior of the peninsula is a savanna type of country, and cattle are reared in some districts. Gold is also mined in a few parts. The chief town, **Palmerstown,** possesses a splendid harbour in Port Darwin, and is the terminus of the overland telegraph from Adelaide, which connects with the cable to Java. **The chief exports** are gold and cattle, but the country is as yet little developed.

THE STATE OF SOUTH AUSTRALIA.

This includes, besides part of the desert tableland already described, the basin of Lake Eyre and the South Australian Highland.

The Basin of Lake Eyre.—This is, in parts, below sea-level, and thus receives the various rivers which rise on the eastern margins of the western tableland, and on the northern ranges which separate it from the plain of the Gulf of Carpentaria. The longest of these rivers are the Diamantina and Cooper's Creek ; but it is only in rainy seasons that these reach Lake Eyre, and many which flow towards it never get so far. The lake itself is in dry seasons merely a collection of saline pools and marshes. The area is chiefly a desert, composed of a clayey soil, strewn with pebbles, formed by the denudation of the sandstone that once covered it ; and the land north of the lake is known as the ' Stony Desert.' Water can everywhere be reached by artesian wells. South-west of Lake Eyre lies the shallow salt lake Gairdner, and to the south there is a valley which is occupied in the north by the salt lake Torrens, and in the south by Spencer Gulf.

The South Australian Highlands flank the valley on the east and are known as Flinders Range in the north. An outlier on the east is called the ' Barrier Range,' and rich supplies of silver are obtained from it round **Broken Hill,** and are conveyed by rail to Port Pirie although the district lies in New South Wales. Copper is mined in the highlands near **Moonta** and **Wallaroo** on Spencer Gulf, as well as at Burra Burra, but in smaller quantity than formerly. These highlands form the most fertile part of the State of South Australia, for they enjoy the Mediterranean type of climate like South-West Australia, and have a fair rainfall in winter. Wheat is grown widely, and is exported from

Port Augusta, Port Pirie, Port Adelaide, and other ports. **Adelaide** —the capital of the State—has a fair harbour at Port Adelaide, which is a calling-place for mail steamers. A railway runs south-east from it to Melbourne, and another follows the telegraph line for some distance northward.

The chief exports of South Australia are wool, wheat, and copper.

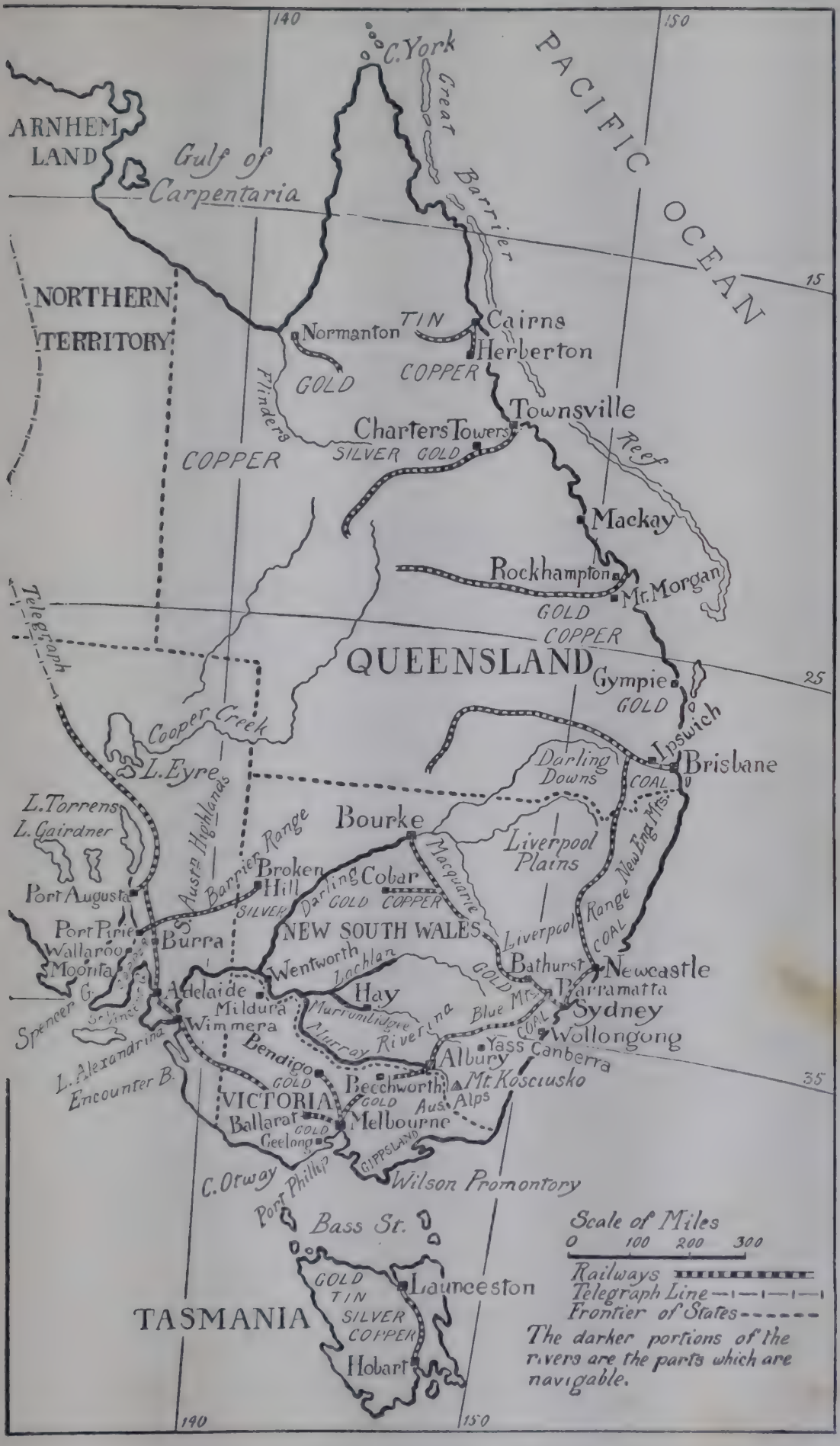
THE BASIN OF THE MURRAY-DARLING.

The Murray rises in the snows that crown the Australian Alps, and its volume is therefore greater and better maintained throughout the year than that of its long tributary, the Darling, though even so it suffers from great fluctuations with the seasons. Its upper course to **Albury** lies chiefly through deep gorges, and is rapid. Steamers of shallow draught can generally ascend to this point, where the railway from Sydney to Melbourne crosses the river. Albury lies on the right bank, and therefore in New South Wales ; for the river is here the frontier between that State and Victoria.

Below this the Murray has a slow, meandering course across its alluvial plain. In some places, by the deposit of silt, it has raised its bed above the level of the surrounding country, and this has made it difficult for tributaries to reach it. No important ones, in fact, reach it from Victoria, but on the right it receives the Murrumbidgee, which has a tributary called the Lachlan, and farther on it is joined by the Darling. The plain between the Murray and Murrumbidgee is called the **Riverina,** and is noted for sheep-rearing and wheat ; but the rainfall is somewhat scanty there, and still less over the **Wimmera** district of North-West Victoria. This region is in some parts a sandy waste, dotted with pine-trees, and in others is covered with scrub. In other parts, again, wheat is being grown, and a more fertile strip along the banks of the Murray around **Mildura** has been irrigated with water from the river, and here grapes, peaches, apricots, and other fruits, are largely cultivated. The Murray, in its lower course, is turned sharply southwards by the South Australian Highlands, and enters the shallow lake Alexandrina. Its exit from this to the sea is across a sand-bar, which prevents all save very shallow vessels from entering the river. This bar is the end of a long line of sand-hills which skirt the coast southward, and behind which there is a long shallow lagoon.

The Darling is formed by the union of many headstreams, of which

the longest rises in a range west of Brisbane, and crosses the **Darling Downs.** This fertile plateau produces nearly all the wheat that is grown in Queensland, and a great deal of fruit, and is also noted for its pasturage. A somewhat similar, though lower, fertile plateau, known as the **Liverpool Plains,** in New South Wales, is crossed by another headstream, which rises in the Liverpool Range ; while yet a third headstream —the Macquarie—rises in the Blue Mountains, and passes through the fertile district around **Bathurst,** which is also noted for gold. These



AUSTRALIA: POLITICAL AND ECONOMIC.

tributaries unite just above **Bourke,** which can be reached by shallow steamers during part of the year, though the meandering nature of the river renders navigation tedious, and in dry seasons the river is reduced to a succession of pools. Bourke is a centre for pastoral occupations, and is connected by rail with Bathurst and Sydney. A little agriculture is also carried on, but is dependent on irrigation, for which the water obtained from **artesian wells** rarely suffices. These wells can be sunk over the whole area, from this point northward to the Gulf of Carpentaria, and eastward over the Lake Eyre Basin, and are valuable for watering live-stock. The Darling receives no tributaries in its lower course, and the region between it and the Murray is a sandy or hard-baked plain, save just after the rains, when it forms a fair grass-land.

THE EASTERN HIGHLANDS.

These lie parallel to the coast, and are perhaps best divided into the Highlands of Queensland, which run north-west to south-west; those of New South Wales, where the direction is north-east to south-west; and those of Victoria, which stretch east and west. In front of each is a narrow coastal plain.

THE QUEENSLAND HIGHLANDS.

Minerals.—These highlands are sometimes called the Dividing Range. They lie close to the shore in the north, but farther south leave a narrow coastal plain. They are chiefly composed of crystalline rocks, which are rich in gold, copper, and tin, and of carboniferous rocks, including coal, which is mined at Ipswich, near Brisbane. The chief gold-fields are at **Charters Towers,** for which Townsville is the outlet; **Mount Morgan,** in the hinterland of Rockhampton; and **Gympie,** north of Brisbane. Copper is found at Mount Morgan, as well as near **Herberton,** where most of the tin also is found.

Climate and Productions.—The Cape York peninsula enjoys a tropical, moist climate similar to that of the Arnheim peninsula. Cocoanuts, bananas, and sugar are grown and exported from **Cairns,** besides tin and copper. The town has a good harbour, and the railway, which runs inland from it, has been projected to Normanton, near the Gulf of Carpentaria. Further south the temperature decreases and varies with altitude. Though the seaboard receives a heavy rainfall, brought by the south-east trade-wind, mainly in the hot season, the fall rapidly diminishes towards the interior on account of the highlands. Sugar,

rice, and tobacco are grown along the seaboard, and wheat and fruit on the Darling Downs.

The rivers which flow to the Pacific have bars at their mouths, and are only navigable for short distances and for shallow vessels. Railways have been carried across the Highlands from **Townsville, Rockhampton,** and Brisbane to the pasture-lands of the interior, and a branch runs from the last named to Sydney. **Brisbane**—the capital of Queensland—has a fair harbour, but, owing to the existence of other ports along the coast, has a restricted hinterland.

The State of Queensland includes, besides these highlands, a belt of pasture-land further west, which passes gradually into the scrublands and deserts of the Eyre Basin. **The chief exports** are gold, silver, copper, tin, coal, meat, hides, tallow, wool, and sugar.

THE NEW SOUTH WALES HIGHLANDS.

These are higher than those of Queensland, and fall into the following groups: (1) **The New England Plateau**, which terminates to the south in the Liverpool Range. (2) **The Blue Mountains.**—These are largely composed of massive terraces of sandstone, and the rivers descend by waterfalls into deep ravines bounded by precipitous cliffs. Hence, although the average height of the range is not very great, it is very difficult to cross, for the natural valley routes end against vertical cliffs. A railway has, however, been taken across it, and connects Sydney with the plains to the west. Carboniferous measures occur on the flanks of the Blue Mountains, and coal is exported from **Newcastle** and **Wollongong.** (3) **The Australian Alps,** which lie partly in New South Wales and partly in Victoria; but the highest peak in the Kosciusko Group, which is 7,000 feet, is in the former.

Climate and Productions.—The climate is mild in winter and hot in summer. The seaboard is well supplied with rain at all seasons, though most falls in summer (November to April). The fall over the highlands is fair, but inadequate for agriculture further west. The prevailing wind in the north is the south-east trade-wind, but many changes in weather are caused by series of cyclones and anticyclones, which frequently traverse Australia from the Indian to Pacific Ocean. The coastal strip is well cultivated, and oranges are grown round Paramatta near Sydney. The seaward slopes of the mountains are clad with forests of eucalyptus, often called 'gum-trees.' These give little shade

when mature, as the leaves hang down in order to suffer little from evapora tion. The westward slopes of the highlands form splendid pasture lands, and New South Wales produces about half the total number o sheep reared in Australia.

Sydney, the capital of New South Wales, stands on the magnificen natural harbour of Port Jackson in the plain in front of the Blue Moun tains. It is thus not far from the coal-fields, and has advantages in th absence of rivals, and in being the focus of railways from Brisbane Bourke, and Melbourne.

The State of New South Wales includes, besides the highlands a large part of the Murray-Darling Basin, and the silver-producing Barrie Range. **The chief exports** are gold, wool, coal, meat, hides, butter wheat, and silver.

THE VICTORIA HIGHLANDS.

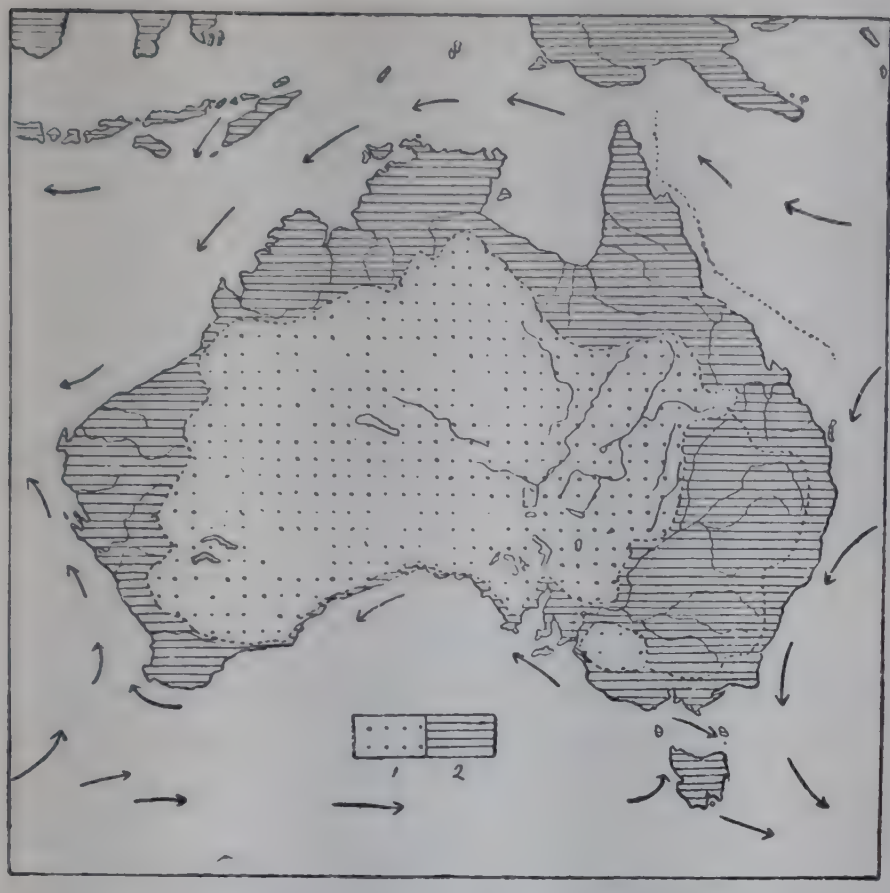
These are noted for gold, which is mined at **Bendigo, Ballarat Beechworth,** and other places. The climate is of the Mediterranean type, like the rest of South Australia, and the vine and olive are grown to some extent on the northern slopes of the mountains, which are no very high. Between these highlands and the plateau which terminate in Cape Otway and Wilson Promontory on the south, there stretches a great valley, which reaches the coast on the east and west, and is nearly divided in the middle by Port Phillip. The western portion of this valley consists of basalt, and is dotted over with the cones of extinct volcanoes The soil is fertile, and many vegetables are grown there. The eastern portion—known as **Gippsland**—forms a rich pasture-land.

Melbourne.—Population in Victoria is densest around Port Phillip and traffic converges from all directions to Melbourne—the capital—on a little bay at the northern end. It has, in fact, almost a monopoly o the commerce of the State, and though vessels experience some difficulty in entering Port Phillip, its harbour—Port Melbourne—is good.

The State of Victoria includes, besides the highlands and th valley and promontories to the south, the plains of Wimmera. **The chief exports** are gold, wool, live-stock, cereals, butter, hides, and meat.

TASMANIA.

This island, which is nearly as large as Ireland, resembles the Victori Highlands, of which it probably once formed a part, and from which i



(1) Areas of inland drainage. (2) Land drained to the ocean.
⟶ = Direction of prevailing currents. (After the Diagram Co.)

AUSTRALIA: RIVER SYSTEM.

is only separated by the shallow, island-studded Bass Strait. It is composed of many different kinds of rocks, and in the west is rich in copper, silver, tin, gold, and coal. The climate is temperate, and as it lies in the belt of the westerly winds at all seasons it is rather wet in the west, and thickly wooded. In the east there are good pasture-lands, and apples, pears, and other fruits, do well. The chief ports are **Hobart**—the capital—which has a good harbour, and **Launceston. The chief exports** are wool, gold, silver, tin, timber, and fruit.

AUSTRALIA—REVISION.

CLIMATE AND VEGETATION.

Australia can be divided into the following climatic areas *: (1) The northern peninsulas, which enjoy a hot monsoonal climate. The natural scenery is forests and savanna, and tropical products can be culti-

* For maps, see pp. 295, 297, 327, 329; and for statistics, p. 346.

vated. (2) The eastern seaboard has a warm temperate climate and good rainfall, brought chiefly in summer by the south-east trade-winds (see p. 303). There are forests on the mountains, and in front good pastures for dairy-farming. Many crops are cultivated. (3) A belt of country south of the first region and west of the second. Here the rainfall is less and the range of temperature greater. The district is suited for wheat in parts but is chiefly devoted to sheep-rearing. (4) The area of inland drainage which is desert or poor grass and scrubland. (5) Southern Australia which has a Mediterranean type of climate and Mediterranean products can be grown. (6) Tasmania, which has a climate like Western Europe and similar forests and products.

FAUNA.

The fauna of the Australian Zoological Province is peculiar, both on account of the number of native mammals not found on other continents and for the absence of nearly all species that occur elsewhere, except bats, mice, and a dog-like animal called 'dingo.' Of the eleven great orders into which zoologists have divided mammals, one—known as the **Monotremata**—is represented in Australia alone. To this order belongs the platypus, or duck-bill, and the echidna, which looks like a hedgehog with a long slender muzzle. Both these animals lay eggs like reptiles but suckle their young.

Another order—known as **Marsupial**—which comprises animals whose young are born in an immature state, and reared and carried about in a pouch, is very well represented in Australia, and outside the continent by a few species now found only in America. The Australian marsupials are adapted to different types of life, and some, in appearance and habits resemble European animals. Thus there are Australian rabbits, cats, and wolves, so called from their resemblance to those we know, but all marsupial. There are also wombats, which look like small bears, and opossums, noted for their fur. The most famous animals of this order are, however, the many varieties of kangaroos. These live on grass and as their skins are of little value and their flesh not appreciated as food—save the tails, which are used for soups—they are being supplanted by the cattle and sheep introduced by European settlers.

Australia had no useful domestic animals till the Europeans brought them, and some of those introduced have proved a terrible nuisance. A great deal of money has had to be spent, for example, in destroying **rabbits,** and in erecting fences to protect areas from their ravages.

Australia is rich in native birds, the largest being the **emu,** found on the plains of New South Wales, and the **cassowary** of Queensland and New Guinea, both of which, like the ostriches of Africa and rheas of South America, cannot fly, though they possess wings. Other rather large birds peculiar to the country are black swans, brush-turkeys, and the bower-birds, which build and decorate bowers. Many of its birds are very beautiful—as the lyre bird, so called from the shape of the tail in the male bird, the crimson lories, parakeets, cockatoos, honey-eaters, kingfishers, and bright-coloured pigeons. Though singing-birds exist, they are not common, and some of the birds have very peculiar cries—as the dull-coloured kingfisher, called the 'laughing jackass.'

Reptiles are numerous. Crocodiles inhabit the northern rivers, and snakes, mostly venomous, are common everywhere.

POPULATION.

The racial origin of the Australian natives presents a difficult problem. By some writers they have been thought to belong to the negro or negrito races, but they have not the woolly or frizzly hair characteristic of these races, and have a profusion of beard, which the negroes have not. In these respects they more nearly resemble the Caucasian race, and may be degraded examples of it akin to certain tribes in South India. Their skin is of a dark-brown hue and their hair black. Their low degree of civilization is probably due in part to the hard struggle for existence that life in most parts of the continent has entailed. They have developed great powers of observation and endurance—both of much service in hunting game—and have shown considerable skill in the use of the boomerang, a curved, wooden weapon which can be thrown so as to return to the thrower, and a throwing-stick, by which a spear can be hurled with great force. The number of natives was much reduced by frays with the early white settlers and by diseases contracted from them. They are now confined within certain reservations or found in the less fertile and accessible parts of the continent. None now exist in Tasmania.

The bulk of the present population of Australia consists of settlers from Europe and their descendants; but Chinese coolies are found in some parts, notably Queensland, though their entrance is now rendered very difficult by various restrictions.

For map showing the distribution of population, see p. 335; and for statistics, p. 349.

COMMERCE.

Though there are protective duties on goods imported from outside there are none between the different States; but internal trade suffers from difficulties of communication with some parts, and from the fact that the railways of Victoria, New South Wales, and Queensland are of different gauges. By far the most valuable **export** from Australia is wool, and then gold. After that in order of value come wheat, copper, hides, and butter.

PACIFIC ISLANDS.

NEW GUINEA.

This island is almost twice the size of the United Kingdom. It is traversed by a central range of mountains, to the south of which there is a plain. The climate is very hot and wet, especially in the north which receives rain from the North-West Monsoon during the Australian summer. The low districts are very unhealthy for Europeans. Much of the island is densely covered with forest, and the chief cultivated products are yams, taro, and sweet potatoes—all grown on account of their edible tuber roots—sago, coconuts, bananas, and the sugar-cane. Copra is exported and fishing is important.

The inhabitants, called **Papuans,** belong to the Melanesian race which is a branch of the Negro. They are tall, well-built, of dark colour and possess black frizzly hair. Many families generally dwell together in large houses, often built on piles, and thatched with leaves. Politically the country is divided between the Dutch, German, and British, the British south-eastern area being known as the Territory of Papua.

THE MELANESIAN ISLES.

These lie on the east and south of New Guinea, and are so called because the inhabitants belong chiefly to this dark race. They include—(1) The **Bismarck Archipelago** and **Solomon Isles.** These, with the exception of the southern Solomon Isles, belong to Germany. The productions are very similar to those of New Guinea, but also include tortoise-shell. (2) **New Caledonia,** which belongs to France, and is used as a penal settlement. The climate is healthy, and the soil fertile and large numbers of cattle and sheep are reared. (3) **The New**

Hebrides Isles, which are under French and British control. They are mountainous, of volcanic origin, and mainly well wooded and fertile. Yams, bread-fruit, and bananas are cultivated for native diet, and copra and sugar are exported. **Bread-fruit,** which grows on a tree, resembles a pineapple in size, but has little flavour, and is always cooked before it is eaten.

The **Fiji Islands,** which are intermediate between Melanesia and Polynesia, have a mixed population, but one that is mainly Melanesian in character. The productions are similar to those of New Hebrides. The climate is healthy, but subject to violent cyclones. The islands belong to Britain, and are a great calling place for steamers.

THE POLYNESIAN ISLES.

These lie east of the Melanesian Isles, and the inhabitants belong to the **Polynesian race,** which is generally considered to be more closely akin to the Caucasian stock than to any other. They are tall, of light copper-brown colour, and possess an abundance of wavy hair. They had attained a high degree of civilization before their discovery by Europeans, and were noted sailors, making long sea-voyages in well-constructed canoes. Though they used no metals, they were skilful in fashioning and decorating weapons and utensils in stone, wood, and coconut-shells, and in making cloth of bark-fibre.

The islands are of volcanic or coral formation, or both. The coral isles are low, and often typical atolls (see p. 225). The typical tree on these isles is the coconut palm, and vegetation is rather restricted in variety. The volcanic isles are generally higher and more fertile, and yield all the products of the Melanesian Isles, bread-fruit being especially important. The best known of the Polynesian Isles is the **Samoan Group,** which is divided between the United States and Germany, and produces much copra. To Germany belong also the **Caroline Isles,** except one isle held by the United States.

The **Hawaii or Sandwich Isles** belong to the United States. They possess both active and extinct volcanoes. One of the latter has a crater of gigantic size, while the crater of another which is in constant activity is filled with hot liquid lava. Sugar is extensively cultivated, as well as rice and other tropical products. The capital—**Honolulu**—is an important calling station for steamers between North America, Asia, and Australia.

NEW ZEALAND.

New Zealand consists of two large islands, separated by Cook Strait, and know as North and South (or Middle) Island, and a smaller island called Stewart, whic is separated from the latter by Foveaux Strait. The total area of these island and a few scattered isles off their shores, is rather less than that of the Unite Kingdom.

NORTH ISLAND.

Configuration and River System.—A belt of ranges traverse th eastern part of the island, running parallel with the coast, which has bee invaded by the sea at Hawke Bay. Another series of ranges forms th backbone of the long peninsula of Auckland. The south-weste promontory of the island is occupied by the extinct volcano of Egmont and the district around Lake Taupo is noted for its volcanoes, geysers and hot springs. Some of the **geysers** send up columns of ho water to a height of several hundred feet at regularly recurring intervals As it passes through the earth, this heated water dissolves out silica an other minerals, which are deposited around the shaft of the geyser, an wherever the water flows over the surface of the ground. Thus in tim were formed the beautiful pink and white terraces which were destroye near the close of last century by an earthquake and volcanic eruption Terraces are now being created again, and the region attracts man tourists, as well as invalids, who benefit by bathing in the warm medicina waters.

The Waikato River, which forms the outlet for Lake Taupo, i navigable for some distance for shallow steamers. The other river which flow in all directions, are little used as waterways.

Climate and Productions.—Though the island lies in latitude which correspond with that of the Mediterranean, and, like Soutl Australia, is only fully exposed to wet westerly winds in the col season, it is cooler, more equable, and moister than the Mediterranea region. The western area is naturally wettest, and here forests ar common. The prevailing trees are pines, and one variety, common i Auckland, called **Kauri,** yields durable timber, and a valuable gu used in making varnishes. Much of this gum is dug up in a fossil co dition, and resembles amber. Another product of North Island is fibre obtained from the **phormium** plant, which can be used like hem in making ropes, but is difficult to prepare. Most Mediterranean fruit can be grown, and wheat is cultivated in the drier eastern district

NEW ZEALAND: POLITICAL.

NEW ZEALAND: ECONOMIC.

Sheep and cattle farming are also carried on. Some gold is mined at the base of the Auckland Peninsula.

Towns.—Auckland, the largest city in New Zealand, stands on a narrow neck of land, and has a good harbour on the east side and a shallow one on the west. It is a regular calling-place of steamers. **Wellington,** the capital of New Zealand, has a good harbour on Cook Strait, and from it two railways run into the interior.

SOUTH ISLAND.

Configuration and River System.—The island is traversed by two belts of ranges which terminate in peninsulas to the east and west of Tasman Bay. The higher western range is known as the **Southern Alps.** Its chief peaks are above the snow-line, the highest, Mount Cook, being over 12,000 feet, and many glaciers occupy their upper valleys. No railway has yet been carried entirely across these Alps, and the chief road has to pass through the Otira gorge at the height of over 3,000 feet. These mountains form the divide in the island, and from them short rivers flow westwards and longer ones eastwards. The rivers of neither series are, however, navigable; for the former are torrential,

and the latter shallow on account of the débris they bring down, and all have bars at their mouths, formed by sediment deposited by sea-currents. The rivers in the south-east drain some of the large lakes which occupy the narrow valleys between the ranges, and the south-west coast is broken by picturesque fiords, which were partly caused by the submergence of river-valleys very long ago. The eastern coast is diversified by the peninsulas of Otago and Banks, which are of volcanic origin. Between these is the Canterbury Bight, backed by the Canterbury Plains, which have been formed by the alluvial deposits of the eastern-flowing rivers.

Climate and Productions.—The climate is very similar to our own, but more sunny. Westerly winds prevail at all seasons, and bring a heavy fall to the western seaboard, where it is promoted by the Southern Alps (see p. 297). These mountains are therefore well forested, and the luxuriant vegetation includes magnificent tree-ferns. The drier Canterbury Plains form excellent pasture-lands devoted to sheep and cattle rearing, and are also well suited for growing wheat and barley. Some coal and gold are mined in the north-west of the island, and gold also in the south.

Towns.—The chief towns are **Christchurch** and **Dunedin,** and both have outports suited for large vessels. They are connected by railway, and export the produce of the plains.

Exports of New Zealand—These, in order of value, are wool, frozen meat, butter, gold, hides, phormium fibre, tallow, and Kauri gum.

POPULATION.

The natives, who are called **Maoris,** are a branch of the Polynesian race. They are physically well developed, and had attained a high degree of culture before their discovery by Europeans. Though they had no knowledge of metals, they showed great skill in making weapons and tools of stone, and in constructing and ornamenting their houses and canoes. Government was carried on by chiefs, appointed over separate tribes, and slavery existed. Their numbers were much reduced by wars with the early settlers, but they do not now seem to be declining. They have adopted Christianity, and shown ability in learning, some rising to be lawyers, while a few are members of their Parliament. New Zealand forms part of the British Empire, and the white population is mainly of British descent,

THE WORLD.

THE EARTH.

Shape and Size.—The earth is practically a sphere, though it is very slightly flattened at the poles. Its circumference at the Equator is 24,899 miles, and there is only 26½ miles difference in length between its polar and equatorial diameters.

Proofs of the Earth's Spherical Shape.—From the fact that men have often been round the world, travelling all the time in practically the same direction, we learn that the earth cannot be a flat plane, but the proof of its spherical shape rests on the following facts: (1) The shadow thrown by the earth on the moon in a lunar eclipse is always spherical. (2) When a ship approaches the shore the sails are seen before the hull, and when a ship goes away the hull disappears first. (3) Our range of vision can be increased in all directions by ascending a height when on a level plain or at sea. (4) The Pole Star, which is seen on the horizon at the Equator, appears to rise above it as a man travels northwards, and, at the North Pole, would be directly overhead. This shows the earth's surface is curved in a north to south direction. (4) The sun rises earlier at places east than west, which proves that the earth is round in a west to east direction; for if it were flat, the sun would be visible at all places at the same time.

Movements of the Earth.—The earth rotates eastwards on its axis once every twenty-four hours, causing day and night. It also revolves round the sun once a year, and as its axis is inclined this motion causes the seasons (see pp. 2, 4, 314). On or about March 21 and September 23 the length of day and night is everywhere equal, so these days are called the Vernal, or Spring, and Autumn equinoxes. In the Northern Hemisphere the shortest day is generally December 22, and the longest June 22, and conversely in the Southern Hemisphere. These dates are called solstices. As the solar year is not a precise number of days the dates vary slightly in different years.

Position.—The fact that the earth rotates enables us to fix position on its surface, for it fixes two points—*i.e.*, the north and south poles, which are the ends of the axis on which it rotates. Having fixed these points, we are able to describe a system of imaginary circles around the earth, and determine the position of places with reference to them.

Parallels of Latitude.—The Equator is the imaginary circle

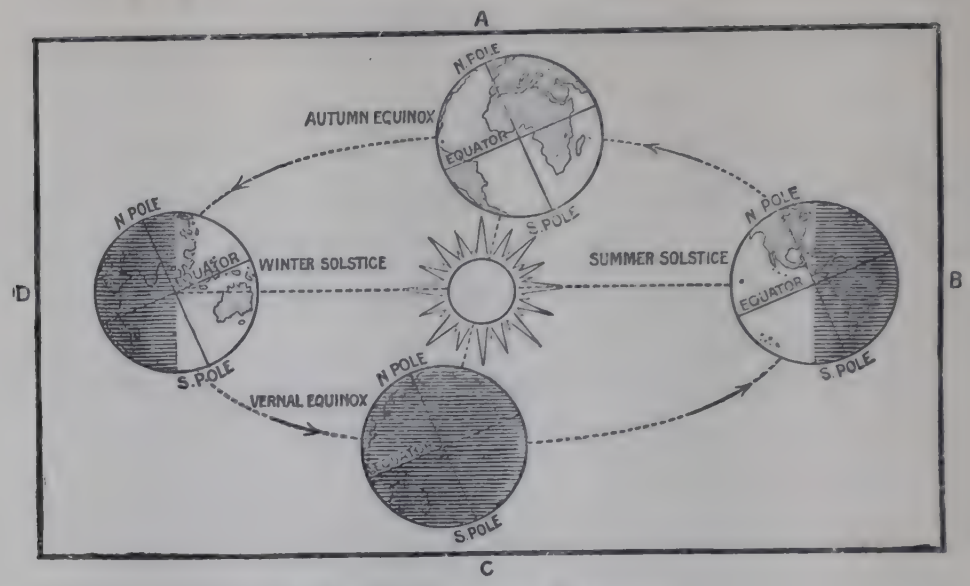


DIAGRAM OF THE SEASONS.

drawn round the earth midway between the poles, and parallels of lat tude are imaginary circles drawn round the earth parallel to the Equato The Equator is a 'great circle,' for its centre is the centre of the earth but the parallels of latitude are 'small circles,' and decrease in siz towards the poles. Since there are 360 degrees—*i.e.*, four right angle —at the centre of every circle, the circumference of a circle can be divide into 360 parts corresponding to these degrees, and distances with refe ence to circles around the earth are always expressed in this manner i degrees. **Latitude** is the name given to the distance of any plac north or south of the Equator expressed in degrees.* The Equator numbered 0°, and the poles 90° north and 90° south respectively; so place can be any latitude between 0° and 90° north and south. A degr can be subdivided into sixty parts, called minutes, written thus ′, and minute into sixty seconds, which are written thus ″. A degree of latitu corresponds to about 69 miles, but varies a very little in length, as t earth is not a perfect sphere.

Meridian Circles are the imaginary circles which are draw round the earth through both poles, and cut the Equator at rig angles. These are all 'great circles.' They are called 'Meridia after a Latin word meaning mid-day, because all places situated on t half of any of these circles between the poles have noon at the same tim

* This distance is often called 'angular distance,' because the latitude of place is thus expressed by the angle between a line drawn from the place to t centre of the earth and the plane of the Equator. Similarly, longitude is express by the angle between the line from the place to the centre of the earth and t plane of the initial meridian.

These half meridian circles are called **meridians of longitude**, and **longitude** is the distance of any place east or west of any selected meridian expressed in degrees. The meridian selected as the initial one is sometimes called the prime meridian, and is generally accepted to be that which passes through Greenwich. This is numbered 0°, and the rest of the 360 are numbered from 0° to 180° east, and from 0° to 180° west. A degree of longitude varies in length from about 69 miles at the equator to zero at the poles.

RELIEF AND STRUCTURE OF THE LAND.

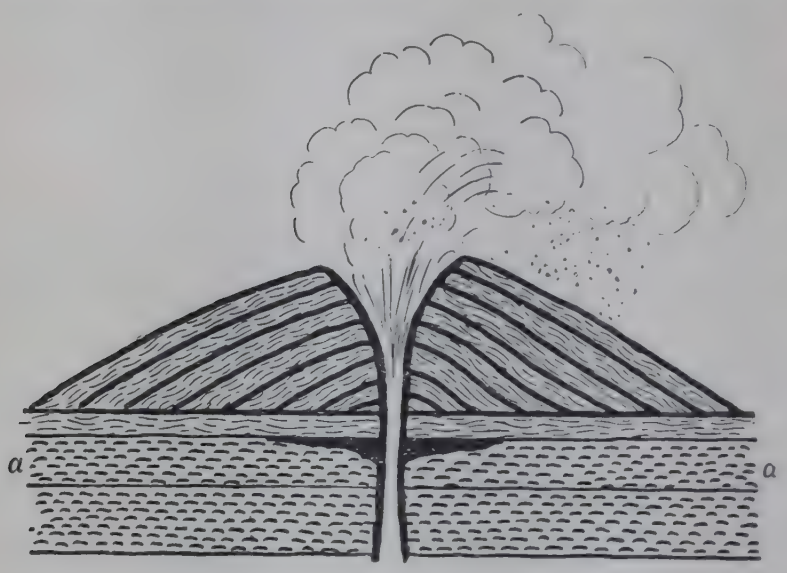
Highlands due to Recent Folding.—The highest mountains of the world lie in a belt bordering the Pacific Ocean, and in another belt which crosses North-West Africa, Southern Europe, and Central Asia. All the ranges which lie in these belts have been formed by gradual earth movements in long past ages, whereby the earth's crust has been wrinkled, or folded, in these areas. In many parts the ranges lie roughly parallel to each other within the belts, and in some cases enclose plateaus. The steepest slopes of the belts are those nearest the sea. Though the folded ranges were formed ages before historic times, they are yet of comparatively recent formation as geologists reckon time, and they seem still to be in rather unstable conditions in some districts (see p. 317).

Earthquakes are far more common in these areas than elsewhere, and are especially frequent in Japan (see p. 166). Most of the active **Volcanoes** of the world also lie in the belt girdling the Pacific, and some in the trans-Eurasian belt. These features mark lines of weakness in the crust of the earth, and in the case of volcanoes the internal forces are sometimes sufficiently strong to eject gases, ashes, and molten matter through their shafts (see pp. 118 and 316).

Highlands due to Ancient Folding.—In some places the folding of the rocks took place so long ago that the present relief has no relation to the original folding, but owes its diversified nature to long denudation and subsequent earth movements. Such districts occur in Northern Europe, Eastern Asia, Eastern Australia, and Eastern United States.

Tablelands.—The remaining areas of high land in the world are the great tablelands of Eastern South America, Africa, Arabia, South India, and Western Australia. Here, though the surface has been diversified by erosion to some extent, it has a more uniform character than in the folded areas. In many parts the rocks are sedimentary in character

—*i.e.*, they are composed of sand and mud which was deposited by water ages ago, and then consolidated by pressure. The hardened layers of mud and sand, called 'strata,' are, of course, naturally deposited horizontally; and though in some cases they have been tilted by subsequent earth movements, in many parts they still retain their original position, and thus give rise to flat-topped mountains.



SECTION OF A VOLCANO.

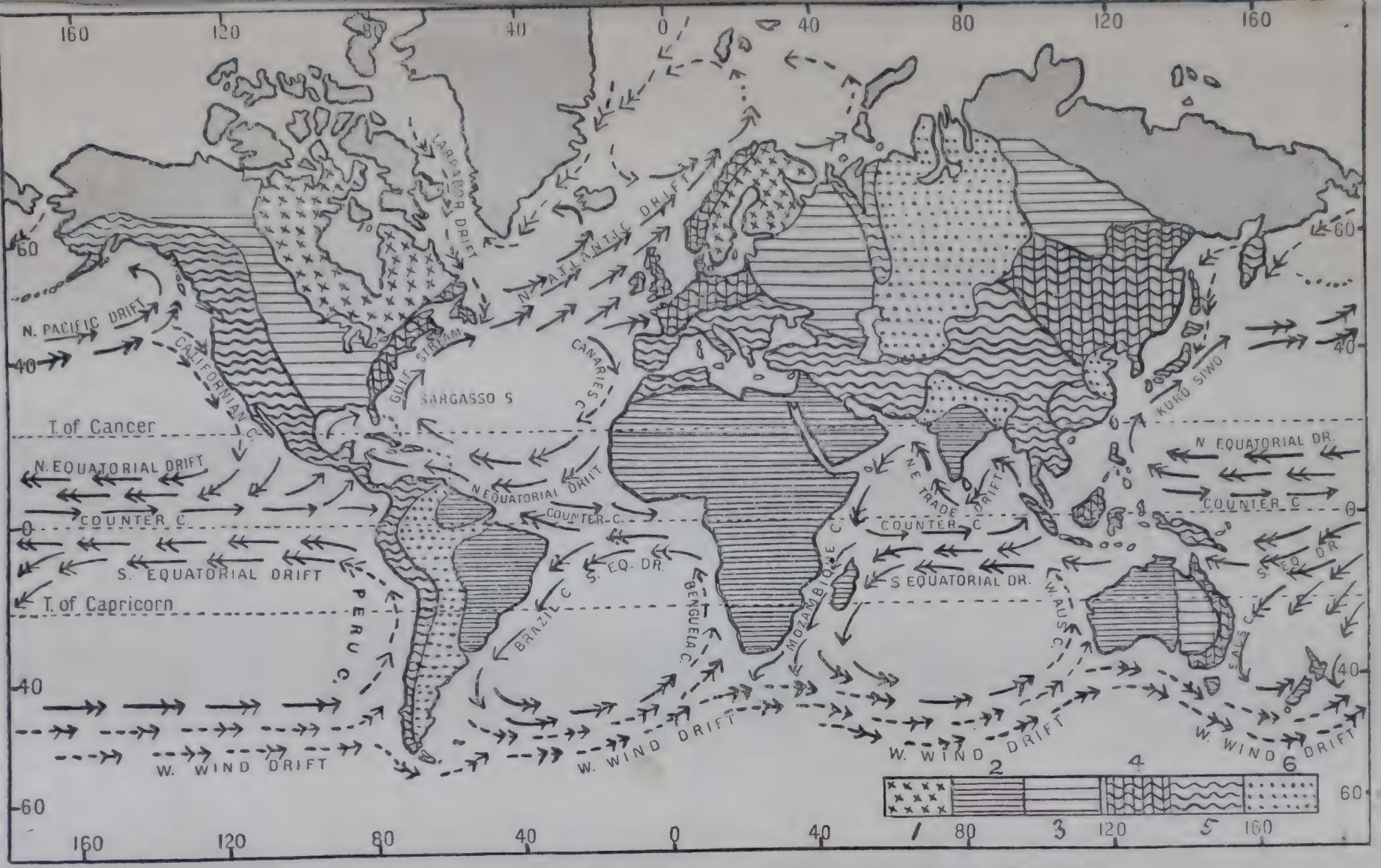
Low Plateaus Composed of Ancient Rocks.—Around Hudson Bay in North America and the Gulf of Bothnia in Europe lie areas of slight elevation, but uneven surface, where the rocks are of crystalline nature, and, on account of their ancient formation, are sometimes called 'archæan.' They owe their origin to heat and pressure, and not, like the sedimentary rocks, to deposition by water. These areas have been much worn down by the agents of denudation (see pp. 62, 63).

Tabular Lowlands Composed of Sedimentary Rocks.—The plains of the middle portion of North America, Russia, Eastern Siberia, and the Murray basin of Australia, are very similar in structure to the tablelands, only not so high.

Lowlands Composed of Recent Deposits occupy the middle portion of South America, Western Siberia, Western Turkistan, and North India.

THE OCEAN.

Size and Depth.—About 70 per cent. of the total surface of the earth is covered by water, of which the greatest amount lies in the Southern Hemisphere. For the most part, the ocean floor can be compared to a great basin of 18,000 to 24,000 feet in depth. In this basin there are, however, some deep pits and some ridges, while bordering the continents there is a high edge or shelf covered with shallow water.



THE WORLD: STRUCTURAL DIVISIONS OF THE LAND AND OCEAN CURRENTS.

1 = Areas mainly composed of old crystalline rocks (Archæan).
2 = Tablelands of old unfolded sedimentary rocks.
3 = Tabular lowlands of old unfolded sedimentary rocks.
4 = Diversified areas composed of old rocks folded long ago and much altered in course of ages.
5 = Ranges and plateaus formed by folding in comparatively recent geological times.
6 = Lowlands composed of comparatively recent geological formations and deposits.

(These divisions are after Herbertson.)

The dotted arrows indicate relatively cold currents. The double-headed arrows indicate drift-currents, and the single-headed arrows stream-currents.

The Atlantic Ocean.—The deepest parts of the Atlantic lie on both sides of a central ridge running from north to south. Another ridge unites Britain with Greenland via Iceland, while from a third rise the West Indies. The continental shelf is broadest off North-West Europe, around Newfoundland, and east of Patagonia. Hudson Bay, the Baltic, and White Sea are all also shallow.

The Pacific Ocean is deepest east off the Kurile and Japanese Isles, and off New Zealand. The islands fringing Eastern Asia and the East Indies rise from shallow submarine ridges. The Bering Sea, and the seas between Eastern Asia and the island girdle, are all shallow.

The Indian Ocean is only deep south of Java. Some shallow and island-studded areas extend between South India and Madagascar.

Submarine Deposits.—The floor of the ocean near the coast is covered with the sand, gravel, and mud brought down by rivers, or worn away by the sea from the shore.

Oozes.—At a distance, however, of at most a few hundred miles from the land the chief deposits are due to the minute shells and skeletons of myriads of tiny sea-animals. One of the commonest classes of these simple animal forms is called 'Globigerina,' and in course of time their remains have formed thick beds at the bottom of the ocean of a sort of mud called 'ooze.' This ooze is mainly carbonate of lime, and if consolidated would resemble chalk. It occurs over the greater portion of the floor of the Atlantic Ocean and large parts of the Pacific and Indian Oceans. It practically never occurs, however, below a depth of 2,500 fathoms, for lime is dissolved by salt water at a great depth.

Other common oozes are the Radiolarian, which is composed of siliceous skeletons of minute animals, and occurs in parts of the Indian, Pacific, and Antarctic Oceans; and the Diatom ooze, which is the remains of vegetable organisms, and is the distinctive deposit of the Southern Ocean.

Red Clay.—The deposit which covers the very deepest portions of the ocean floor is a kind of red clay. This is thought by some scientists to be partly the residue of all the oozes which have undergone great changes by the time they reach these depths. The clay is also due to volcanic ash, which is mixed with all the other deposits, and predominates here on account of its insoluble nature.

Salinity of the Ocean.—About 96 or 97 per cent. of the ocean is pure water, and the rest consists of various salts, of which common

salt is by far the most abundant. The amount of salinity in the surface water varies in different places. It is greatest where evaporation is great and the supply of fresh water derived from rain or rivers comparatively small, as in the case of the Red and Mediterranean Seas, and the belts of ocean that lie in the track of the trade-winds; or in the calms north of the Tropic of Cancer and south of the Tropic of Capricorn. For similar reasons, the salinity is least where rainfall is heavy or evaporation comparatively slight, as in the Indian, Arctic, and Southern Oceans. The density of water increases with its salinity.

OCEAN CURRENTS.

Causes.—Currents are chiefly due to two causes: first, the influence of steady winds; and, secondly, the fact that water strives to find its own level. The former class are called 'drift currents,' and the latter 'stream currents.' The direction of the currents is affected by the presence of land masses, and by the deflective force due to the rotation of the earth (see p. 317).

Wind-caused, or Drift, Currents.—The trade-winds blow the surface waters of the Atlantic, Pacific, and Indian Oceans westwards, forming the north and south equatorial currents, and the westerly winds of the temperate zones blow them eastwards. In the Northern Hemisphere the North Atlantic and North Pacific Drifts are due to these westerlies. In the Southern Hemisphere, besides a South Atlantic, South Pacific, and South Indian Drift, there is an eastward Drift due to the prevailing west wind all round the world south of the southern continents, which is of much importance for navigation. In monsoon areas, as the North Indian Ocean, the currents vary in direction with the winds. The cold currents which skirt Labrador and North-Eastern Siberia and Japan are partly due to northerly winds.

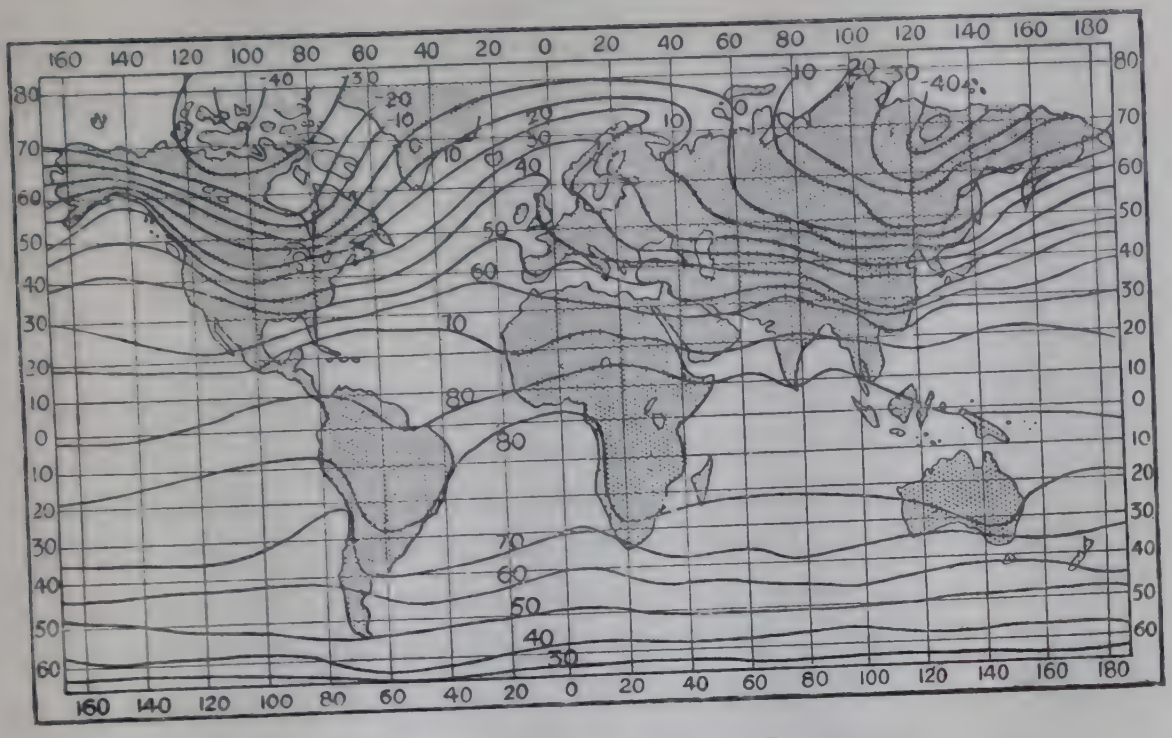
Counter-balancing, or Stream Currents.—Of the water blown westwards by the trade-winds part escapes eastwards, in the intermediate belt of equatorial calms, forming the counter equatorial currents of the Atlantic, Pacific, and Indian Oceans. The water piled up by the north-east trade-winds against the West Indies escapes northwards as the Gulf Stream, and that against the East Indies as the Kuro Siwo Current (see pp. 167, 194). Similarly, in the Southern Hemisphere the Brazil, Mozambique, and East Australian Currents are due to water

escaping southwards to balance the piling up of water against the eastern shores of South America, Africa, and North Australia by the south-east trade-wind. Again, the action of the westerly winds of the Northern Hemisphere in driving water against the shores of Western Canada and Europe is partly neutralized by the southward-flowing Californian and Canaries Currents. So, too, in the Southern Hemisphere a similar relief is afforded to the waters heaped up by the westerly winds against South America, South Africa, and Australia by the Peru, Benguela, and West Australian Currents.

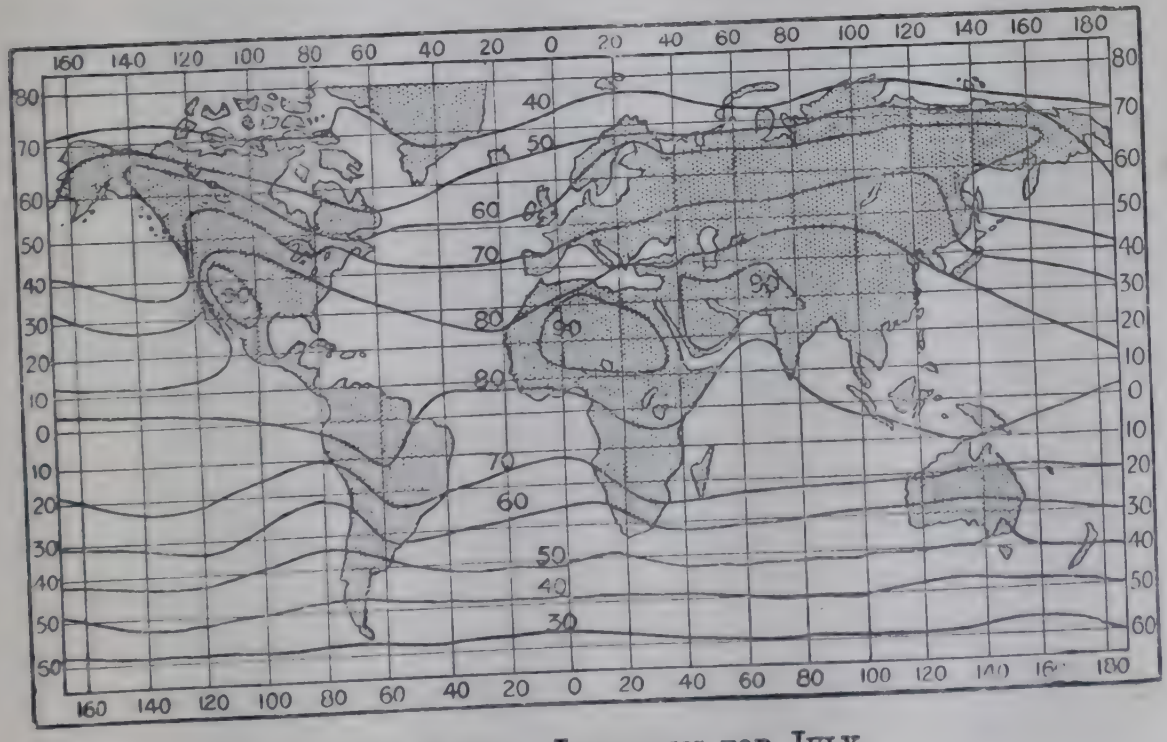
The result of the Drift and Stream Currents combined is to produce a sort of swirl of waters which, in the Northern Hemisphere, circles round the oceans in the same direction as the hands of a clock, and in the oceans of the Southern Hemisphere in the opposite direction. These swirls enclose areas of relatively calm waters, and the one in the North Atlantic, which is called the Sargasso Sea, abounds in seaweed.

Currents into, and out of, nearly Enclosed Seas.—The level of the water in nearly enclosed seas is considerably affected by evaporation, rainfall, and the amount of water derived from rivers. These factors, therefore, often give rise to inflowing and outflowing currents. The level of the Mediterranean Sea, for example, tends to sink below that of the Atlantic on account of the comparatively small amount of water it receives to make up for that lost by evaporation. This inequality gives rise to an inflowing surface current at the Straits of Gibraltar, which, in its turn, gives rise to an outflowing undercurrent of comparatively saline water. For similar reasons there is an outward surface current from the Baltic, which receives much fresh water from rivers and an inflowing undercurrent of salt water.

The Temperature of Currents depends largely on their place of origin ; for those coming from low, hot latitudes retain their warmth for a great distance, and those from high latitudes their coldness. The temperature of ocean water decreases, however, not only with distance from the Equator, but with depth. This partly accounts for the coldness of the currents off the west coasts of South America, South Africa, and Western Australia, where off-shore winds blow the surface waters away and cold water from below wells up to take its place. The temperature at the bottoms of seas which, like the Red and Mediterranean Seas, are cut off from the ocean by comparatively shallow sills, will, however, be as high as that of the water at the sill.



THE WORLD: ISOTHERMS FOR JANUARY.



THE WORLD: ISOTHERMS FOR JULY.

The temperatures are reduced to sea-level.

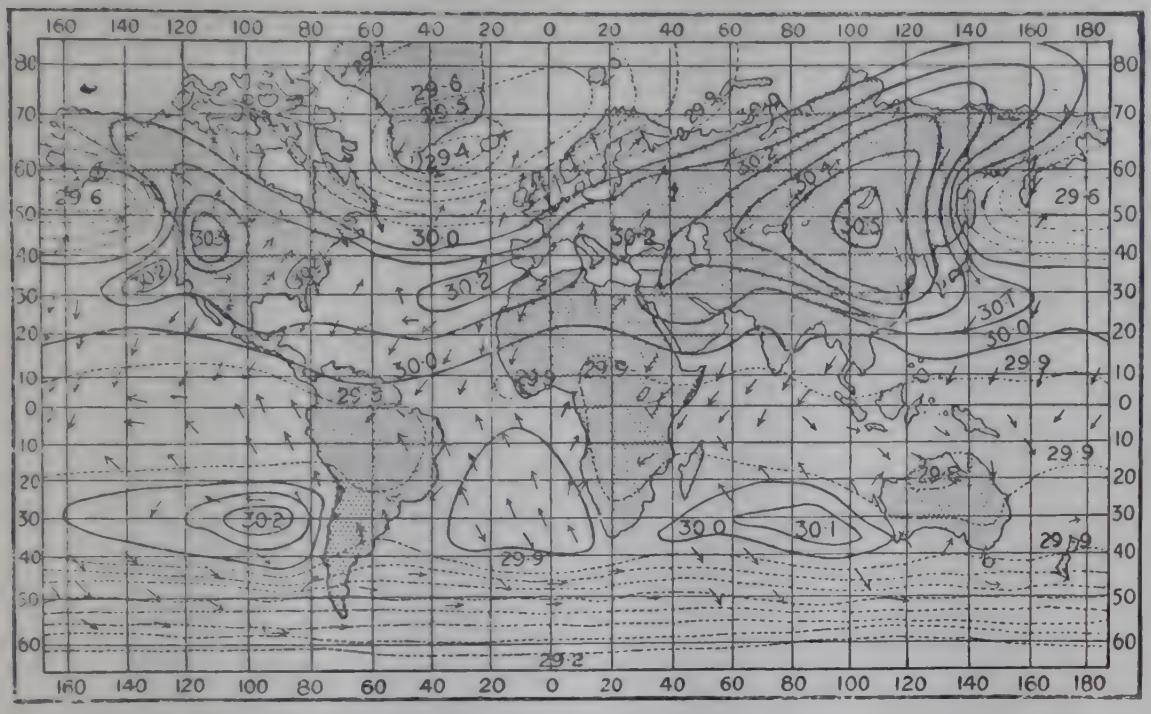
CLIMATE.

The Distribution of Temperature over the world is shown on the maps on p. 321, and the chief causes which affect temperature are given on pp. 4 and 5. The chief factors which upset the distribution of temperature that would be expected from latitude are the south-west winds, which raise the temperature of Western Canada and Western Eurasia, compared with Eastern Canada and Eastern Eurasia; and the cold currents, which, by the agency of local winds, reduce the temperature of the western coasts of South America and South Africa, compared with the eastern coasts, which are bathed by warm currents. There are also modifications due to altitude which are not shown on the isothermal maps.

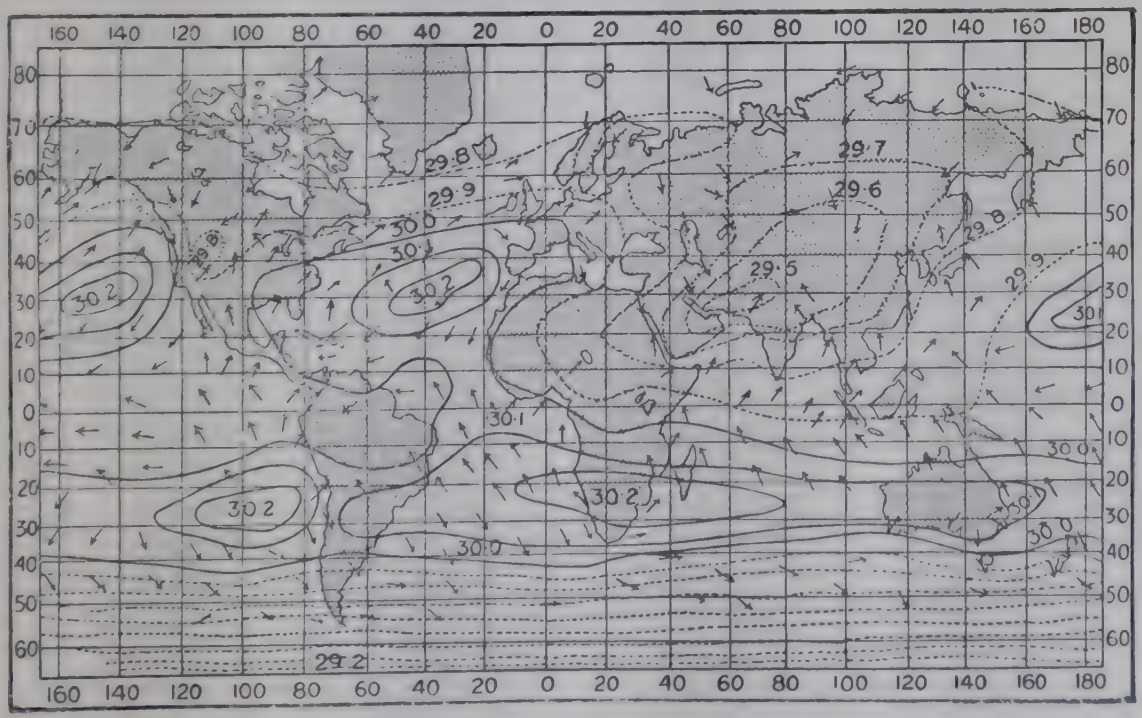
The Range of Temperature is comparatively slight in tropical lands, though fairly great over the deserts which lie about the Tropics of Cancer and Capricorn. The range is great over the lands of the North Temperate Zone, with the exception of coastal areas exposed to the moderating influence of westerly sea-winds. In Northern Canada and Siberia the range is excessive, both on account of latitude and remoteness from sea-winds.

The Distribution of Atmospheric Pressure is shown on the maps on p. 323 as it would be at sea-level. Hot air rises up and expands, and thus the pressure over a heated surface, as the equatorial regions, is less than over a cold surface, as the polar regions. The change in the degree of pressure at different seasons is greater, too, over the land than over the sea, because the change in temperature is greater. The belts of high pressure, which lie about latitudes 30° north and south of the Equator, are not due, however, to the influence of temperature but partly to the fact that the air which has risen up in equatorial regions has gone northwards and southwards as upper currents of the atmosphere, and, becoming cooled, descends in about these latitudes. The general distribution of pressure over the world, ignoring seasonal differences, is therefore low pressure over equatorial regions, high pressure over latitudes 30° north and south, lower pressure again over latitudes about 50° and 60° north and south, and high pressure over polar regions. These belts of pressure shift a little northwards with the heat belt in our summer, and a little southwards in our winter.

Winds are caused by air flowing from regions of high pressure to regions of lower pressure. They are deflected, by the rotation of the earth, to the



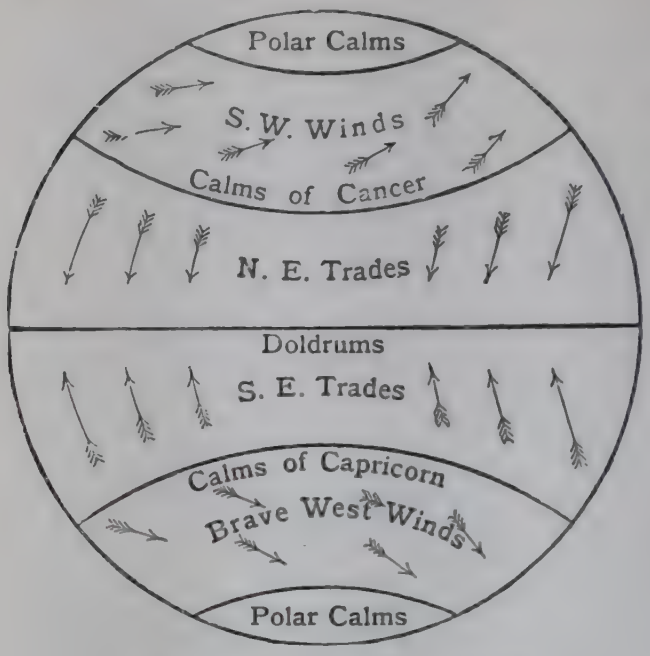
THE WORLD: ISOBARS AND WINDS FOR JANUARY.



THE WORLD: ISOBARS AND WINDS FOR JULY

The pressures are reduced to sea-level.

right hand of their path of motion in the Northern Hemisphere, and t
the left in the Southern.
From the belt of high pressur
about latitude 30° north wind
blow southwards and north
wards, and become, throug
deflection, the north-east trad
winds and the south-westerl
winds. The latter in hig
latitudes are nearly due west
In the Southern Hemisphere
the winds blowing northward
from the high-pressure bel
about 30° south become, by de
flection, the south-east trades
and those blowing southward
the north-west, or westerly winds of the 'Roaring Forties.'



THE WORLD: WIND SYSTEM.

All these winds shift northwards and southwards with the seasona
shifting of the pressure belts. This explains why it is only in our winte
that the south-west winds of the Northern Hemisphere blow far enoug
south to markedly affect the Mediterranean region and California
Valley (see pp. 109, 228). Similarly, it is only in the winter season of th
Southern Hemisphere, which corresponds to our summer, that th
west winds blow far enough north to bring much rain to Middle Chil
the Cape area, and Southern Australia (see pp. 240, 284, 306).

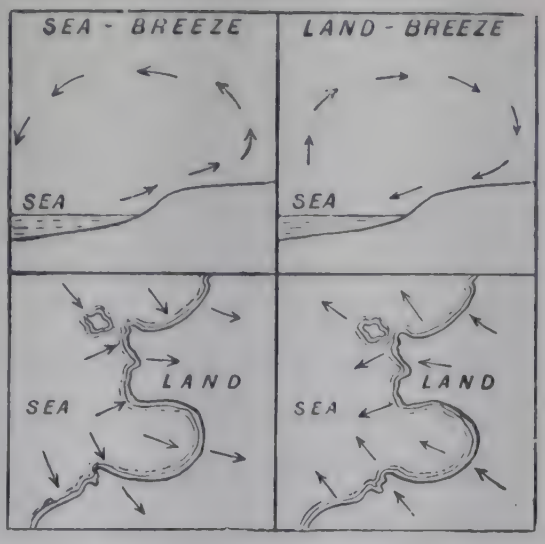
Belts of Calms occur between the belts of regular winds. In th
belt of equatorial calms, sometimes called the Doldrums, there is a co
stant upward motion of air, but slight regular winds; while in the bel
of high pressure, sometimes called the Horse Latitudes, air is descendin
but winds are also generally slight.

The Monsoons and land and sea breezes owe their origin to th
unequal heating of land and sea, and thus unequal distribution of pressu
(see p. 156). Many winds, of a more varying character, are due to are
of low atmospheric pressure occasioned by local and changing cause
and are cyclonic in nature (see pp. 6, 206, 207, 303).

Rainfall.—The annual distribution of rainfall over the world
shown on p. 327, and its seasonal distribution over the separate con

* The law thus describing this deflection is often attributed to Ferrel.

nents on pp. 4, 5, 136, 137, 195, 241, 251, 297. The chief causes determining rainfall are given on p. 6. Very heavy rain falls in equatorial regions and in parts of the Monsoon areas. The fall is also fairly heavy over western coasts exposed at all seasons to westerly winds, and over eastern coasts exposed to the trade-winds. There is a deficiency of rain in Arctic and Antarctic regions, and the central plains and plateaus of Asia and North America, and over Arabia, the Sahara, Central and Western Australia, Western South Africa, North Chile and Coastal Peru, and Patagonia.



LAND AND SEA BREEZES.
The upper figures in section; the lower figures in plan.

For the climatic regions of the different continents, see pp. 122, 184, 227, 242, 286, 305.

VEGETATION.

REGIONS OF NATURAL VEGETATION.

The distribution of vegetation depends mainly on climate, and the areas over which certain types of natural vegetation predominate are shown on p. 329.

Arctic Vegetation.—Regions near the poles are destitute of vegetation, as they lie buried under snow and ice. The vegetation of Lapland, the Tundras of Northern Eurasia, and the Barren Lands of Northern Canada has been described on pp. 93, 128, 198.

Temperate Vegetation.—A great belt of **forests** occupies the cooler latitudes of the North Temperate Zone, consisting of coniferous trees in the north and on the upper slopes of mountains, and of deciduous trees farther south (see p. 131). In the South Temperate Zone there are also forests in Eastern Australia and Southern Chile. The temperate forests fade gradually into the temperate **grasslands.** These form the steppes of Southern Siberia and South-Eastern Russia, and the prairies of Southern Canada and the United States. They also occupy the Murray basin of

Australia, and form the Pampas of the Argentine Republic (see pp. 135. 236). Over the **Mediterranean Region** a special type of vegetation prevails, which is suited to a dry, hot summer, and includes trees and shrubs which are generally evergreen and small-leaved (see p. 109). The same type of vegetation is found in the Californian Valley, Middle Chile, the Cape area, and Southern Australia, where the climatic conditions are similar.

Deserts occur on the plateaus of Central Asia and the Western United States, as well as in Arabia, North Africa (the Sahara), Central Australia, Western South Africa, and coastal Chile and Peru. The deserts are bordered by poor grasslands and **scrublands.** Patagonia is also a semi-desert area.

Tropical Vegetation.—Dense **Tropical Forests** extend over the Amazon Basin (*i.e.*, the Selvas), the Congo Basin, and Upper Guinea coast, parts of Indo-China, and the East Indies (see pp. 234, 269). These are flanked by the tropical grasslands, called **Savannas,** where trees often occur in clumps, and along the river courses. Good examples of tropical grasslands of an open nature are seen in the Llanos and Campos of South America. A mixture of grass and woods, composed of broad-leaved evergreen or deciduous trees, occurs over much of South-East Asia and the Eastern United States.

For vegetation affected by altitude, see pp. 80, 272, 273.

SOME VEGETABLE PRODUCTIONS OF ECONOMIC IMPORTANCE.

Cereals — Wheat seems to do best in temperate regions with warm and rather dry summers, and in a fairly stiff soil. In some parts it is sown before the winter, and in others in spring. The countries which produce most wheat are the United States (22%),* especially in the Central Northern States; Russia (17%), chiefly in the south-west; France (10%); India (9%); Austria-Hungary (7%); and Italy (5%). A considerable amount of wheat is also exported from Southern Canada, Argentina, and Southern Siberia, and these areas are rapidly increasing in importance.

* The figures in brackets after the countries show the amount of the commodity which is produced in them in percentages of the world's total production. They are inserted to give some idea of relative importance, but are not intended to be memorized. They are based on the tables given in Bartholomew's 'Atlas of the World's Commerce,' which give average statistics for three recent years, and which students would do well to consult for further information.

THE WORLD: MEAN ANNUAL RAINFALL. (After Herbertson.)

(1) = 0 to 10 inches; (2) = 10 to 20 inches; (3) = 20 to 40 inches; (4) = over 40 inches.

Oats and **Rye** can stand more cold than wheat, and do best in a moister climate. Rye can be grown on very poor soil. The chief countries for the production of oats are the United States (27%), Russia (22%), and Germany (13%); and for rye, Russia (53%), and North Germany (22%). **Barley** can be grown over a wide range of latitude, but it is most important in the same parts of Russia (27%), Germany (11%), and the United States (10%), as are best suited for wheat. **Maize** requires more heat than wheat. By far the chief producing area is the prairie district south of the Great Lakes in the United States (72%). **Rice** is most largely produced on the low, hot moist lands of China (43%) and India (35%), and is also important in Java (7%) and Japan (7%).

Sugar.—Rather more sugar is still obtained from cane than from beet, but beet-sugar is exported more than cane. The production of **beet-sugar** involves a good deal of labour, and expensive machinery is required to refine it. The refuse beet, after the extraction of the sugar, however, forms a good food for cattle. Sugar beet is chiefly grown on well-manured fields in Central Germany (33%), Austria-Hungary (20%), North France (17%), South-West Russia (13%), and Belgium (5%). **Cane-sugar** is a product of moist tropical and sub-tropical lands (see p. 163). It is chiefly produced in India (36%), where it is used for home consumption, Java (14%), Cuba (13%), the Hawaiian Isles (5%), and Southern United States (4%).

Tea, Coffee, and Cacao are all productions which require a considerable amount of heat and moisture with the heat. Tea is, however, a hardier plant than coffee, and coffee than cacao. Whilst tea, therefore, can be grown in warm temperate, as well as tropical, regions, and is generally grown on hillsides, cacao does best on lowlands not far from the Equator (see pp. 147, 162, 221). The countries which export the most **tea,** in order of the value of the export, are India (36%),* China (34%),* Ceylon (21%),* and Japan (4%).* China exports more than India in quantity, but the quality is poor. By far the most important **coffee** exporting country is Brazil (62%)*; others of some importance are Colombia (6%),* Java (5%),* and Venezuela (4%).* **Cacao** is chiefly produced in Ecuador (19%), Brazil (16%), the island of St. Thomas in the Gulf of Guinea (15%), Trinidad (12%), and Venezuela (9%).

* These figures show the percentage of the total value of the export from all countries.

THE WORLD : NATURAL VEGETATION.

1. Ice deserts and tundraa.
2. Deserts.
3. Scrublands and poor grasslands.
4. Mediterranean type of vegetation.
5. Grasslands.
6. Savannas ; often park-like scenery.
7. Mixed wood and grassland, largely cultivated.
8. Temperate and tropical forests.

Wine is obtained from the vine, which flourishes in temperate lands with a warm and rather dry summer. It is thus well adapted to a Mediterranean type of climate (see p. 109). The countries which produce most are France (36%), Italy (26%), Spain (12%), and Austria-Hungary (5%). The yield of wine in Italy is more valuable than that of France, though less in quantity.

Vegetable Fibres.—The most important of these is **cotton**, which is obtained from a plant grown in tropical and subtropical lands, which receive a fair amount of rain in summer. Cheap labour is required to cultivate the plant with financial success (see p. 163). Most cotton is produced in the United States (64%). Other cotton-producing countries are India (13%), Egypt (7%), and China (5%). **Flax** is grown for the sake of its fibre, which is used for making linen, in the cooler parts of Europe, mainly in Northern Russia (90%). The flax grown in India, South America, and other warmer countries is chiefly valuable for the oil obtained from the seed, which is called 'linseed.' **Jute** is practically confined to Bengal (see p. 173). **Coir** is the fibre of the coco-nut, which, like copra, is chiefly exported from the East Indies, Ceylon, and the Straits Settlements.

Rubber is chiefly exported from Brazil (66%)* and Belgian Congo (15%);* and **gutta-percha,** which is the hardened juice of several other tropical trees, from the Dutch East Indies (58%) and Straits Settlements (39%).

Tobacco can be grown in temperate as well as tropical lands, provided it is protected from frost when young. The chief countries producing it are the United States (34%), especially the Middle Eastern States, India (23%), and Cuba (23%).

Timber is chiefly exported from Russia, including Finland, the United States, Sweden, and Canada.

FAUNA.

The Zoological Provinces.—On account of the barriers presented to the dispersal and intermingling of animals by seas, deserts, and plateaus, the native fauna has assumed marked characteristics in different parts of the world. Zoologists have therefore been able to broadly divide the world into the provinces shown on p. 331. Of these, the Australian

* The percentage of the total value of the export.

THE WORLD: ZOOLOGICAL PROVINCES.

I. Palæarctic. III. Oriental. V. Neotropical
II. Nearctic. IV. Ethiopian. VI. Australian.

is the most sharply defined from the rest, for the length of time during which the continent has been separated from other land-masses has allowed a primitive type of fauna to persist there (see p. 306). The Neotropical province ranks next in distinctive character (see p. 243), and then the Oriental and Ethiopian (see pp. 186, 288). Lastly come the two large remaining provinces, the Nearctic and Palæarctic, which have much in common (see pp. 186, 288). In many districts the native animals have been, or are being, exterminated, either for the sake of the skins they yield, or because they are injurious to man, and of less value than the domestic animals which the land might otherwise support.

Fauna and Vegetation.—Each of the above-mentioned provinces contains a great variety of animals, the distribution of which has been largely determined by climate and vegetation. Thus there are classes of animals specially adapted to dwelling in the Tundras and Barren Lands of the far north, in the temperate forests, on the steppes, savannas, and scrublands, in hot deserts, and in tropical forests.

Protective Colouring.—In some cases animals have skins of a very similar colour to their natural surroundings, so that it is difficult to detect their presence. Examples of protective colouring are seen in the white coats of many polar animals, the tawny hue of those frequenting

deserts, and the striped and spotted skins of those which inhabit woodlands, where the general broken effect of light and shade is similar.

Insular Fauna.—The native fauna of islands near a land-mass to which they were once connected is similar to that of the adjacent land-mass, but more restricted and primitive. In the case of islands far out at sea, which seem never to have been connected with a continent, the native fauna is reduced to birds, and such reptiles and insects as may have been carried thither on floating logs or by other means.

SOME ANIMALS OF ECONOMIC IMPORTANCE.

Wild Animals.—The most valuable of these are the fur-bearing animals of the northern forests (see pp. 132, 198) and the African elephant on account of the ivory it yields (see p. 288).

Cattle are extensively reared on the grasslands of Europe (34%), India (26%), the United States (20%), Argentina (6%), and Eastern Australia (3%). The chief regions for exporting cattle and meat of all kinds are, in order of the value of the export, the United States (49%), Argentina (11%), South Canada (9%), and Denmark (8%).

Sheep are suited to grasslands in temperate regions, and do best in a rather drier climate than cattle. The chief wool-producing countries are Europe (29%), Australasia (25%), Argentina and Uruguay (19%), and the United States (15%). The countries which export most are Australasia, Argentina, and South Africa. The merino breed of sheep, which yields the best wool, is poor as mutton. British sheep form good mutton, and so do many cross-breeds between English and merino sheep introduced to Australasia. New Zealand and Argentina are the chief mutton-exporting regions, on account of their machinery for preserving meat.

Goats are common in Mediterranean countries, and the Angora goat of Asia Minor, which yields mohair, has been introduced to South Africa. The wool of the Kashmir goat of India is also famous.

Silkworms are reared in some countries where mulberry-trees can be successfully grown, on the leaves of which they feed. The large supply of cheap skilled labour required, however, limits the areas of supply. The chief silk-producing countries are China (33%), Japan (26%), and Italy (21%).

Beasts of Burden.—Horses and ponies have been introduced by man to most countries, and cattle, mules, and donkeys are also common

beasts of burden in many lands. These are supplanted in Northern Eurasia by the reindeer (see p. 94), and in Northern Canada and Greenland by dogs, while the camel is generally used for transport in hot deserts (see p. 149). The llama is used in the Andean districts of South America, and the yak in the Himalayas and Tibet. In South-East Asia the elephant is sometimes employed (see p. 179).

Fish.—The chief cod, herring, and mackerel fisheries of the world are those of the North Sea, and off Newfoundland and the New England States of America. Cod and herring are also caught around the northern Japanese islands. Of great value, too, are the salmon caught in the western rivers of Canada and the United States, the white fish and trout of the Great Lakes, the sturgeon from the Caspian, and the sardine, anchovy, and tunny obtained from the Mediterranean. Seals are caught off the eastern shores of Canada, but the fur-bearing kind is confined to the Bering Sea. The kind of whales which furnish train-oil are most plentiful in the Arctic Ocean.

Shellfish.—The chief oyster fisheries are in Chesapeake Bay in the United States and off Brittany in France. **Pearls** are obtained from a species of oyster found in the Persian Gulf; the Gulf of Manaar, near Ceylon; around the East Indies; and off the north-west coast of Australia. The lobster fisheries of the maritime provinces of Canada are very important.

COAL AND METALS OF ECONOMIC VALUE.

Coal is a vegetable product, but resembles minerals in its method of occurrence. The countries which produce most coal at present are the United States (34%), the United Kingdom (27%), and Germany (18%) (see pp. 66, 87, 215). Much is also mined in France (4%), Belgium (3%), Austria, and Russia. Large fields as yet comparatively little worked are known to exist in China, Canada, India, and New South Wales. Another production which is important as fuel is **petroleum.** This is chiefly produced in the United States (53%), and in Russia near Baku (36%).

Useful Metals.—Iron is chiefly produced in the United States (34%), Germany (18%), and the United Kingdom (14%) (see pp. 66, 87, 215). Other countries which yield important amounts are Spain (7%), Russia (6%), France (5%), Sweden (4%), and Austria (4%). **Copper** comes mainly from the United States (58%) (see p. 215); a good

deal is also obtained in Mexico (9%), Spain (7%), and Australia (5%). The chief producer of **lead** is also the United States (55%), the next most important producers being Spain (19%) and Germany (16%). **Tin** is chiefly obtained from the Straits Settlements (62%), Bolivia (13%), and the Dutch East Indian island called Banka (12%). **Zinc** comes chiefly from the United States (29%), Belgium (22%), and Silesia in Germany (19%). **Mercury**, or quicksilver, is mainly derived from the United States (37%), Spain (28%), and Austria (13%).

Precious Metals.—Gold generally occurs either embedded in quartz veins of rock, when the ore has to be mined before the gold can be separated from the rock, or in alluvial deposits, when it can be at once separated from the refuse by washing. The chief gold-producing countries are the Transvaal (28%), the United States (21%), Australia (19%), Russia (6%), and Canada (5%). Nearly half the Australian output comes from Western Australia; the two States ranking next in importance are Victoria and Queensland. **Silver** is chiefly obtained from Mexico (36%) and the United States (32%). Some is also mined in Bolivia (6%) and Australia (6%). **Platinum** is almost exclusively obtained from the Ural region in Russia.

POPULATION.

THE DISTRIBUTION OF POPULATION.

The chief factor determining this distribution, which is shown on p. 335, is climate. Other important factors are the relief of the land, the fertility of the soil, and the distribution of vegetable, animal, and mineral productions of use to man. These factors determine the natural wealth of districts and the occupations which can be carried on, but the standard of civilization attained by a nation has also great influence in determining the number of persons that a district can support. A high standard leads to improved methods of stock-rearing and agriculture, and to the manufacture of articles which can be exchanged for the food-products of other lands.

Areas of Slight Population.—The uninhabited or very slightly populated areas of the world are the Tundras and Barren Lands of the North, the vast forests of Canada and Siberia, the high plateaus of Central Asia and North America, all the hot deserts of the world, the Selvas of South America, and Patagonia. All these correspond with

THE WORLD: DISTRIBUTION OF POPULATION.

(1) Under 1 person per square mile; (2) 1-50; (3) 50-200; (4) over 200.

areas of great cold or very slight rainfall, with the exception of th unhealthy Selvas region. In all these areas occupation is chiefly re stricted to hunting, fishing, and collecting natural produce, though little agriculture is carried on in the desert oases and in forest clearing

Population is also rather sparse over the vast areas of Asia, Nort America, Africa, and Australia, where an inadequate rainfall restrict vegetation to grass, and occupation to pastoral pursuits.

Areas of Dense Population.—The areas of densest populatio are South-East Asia, Western Europe, and Eastern United States. I India, China, and Japan the climate is both healthy and suited for man valuable crops. Here the chief occupation is agriculture, though stock raising is carried on in parts, and manufactures are increasing. I Western Europe and Eastern United States the climate is suited fo mixed farming, but this is largely supplemented, and in some areas sup planted, by manufacturing industries. Egypt has also a dense popula tion in the Lower Nile valley, supported by agriculture based on irrigatio

Population is also fairly dense over the hot, wet, tropical districts Central America, coastal Brazil, Central Africa, and the East Indie and over the fairly moist temperate regions of the Argentine, South-Ea Africa, and Eastern Australia. The chief occupations in Central Afric and some of the East Indies are still only collecting forest production hunting, and primitive agriculture. Elsewhere the chief occupation agriculture or stock-raising, or often both combined.

RACE.

The primary racial divisions into which the inhabitants of the wor have been grouped are—(1) The Caucasian ; (2) the Mongolian, of whic the American Indian is thought by most ethnologists to be a branch (3) the Negro. These are sometimes popularly called (1) white, (2) yello and red, and (3) black races, according to the colour of the skin of a lar number of the members of each division ; but really there exist so ma variations in colour that it would be impossible to classify on this ba alone, and other characteristics have to be considered. The problem also complicated by the fact that in some cases intermarriage has tak place so freely as to deface the distinctive racial traits ; while in others lo residence in different environments seems to have modified the striki features of the main stock.

The Caucasian Race includes nearly all the inhabitants of Euro

Western Asia, India, and North Africa (see pp. 124, 187, 289). By immigration in recent historic times this race has also spread over Southern Siberia, North and South America, South Africa, Australia, and New Zealand. The native inhabitants of the Polynesian Isles of the Pacific, and New Zealand, are also more akin to the Caucasian race than any other. The same is even said by some modern ethnologists of the native Australians, though these were formerly regarded as Negrito (see pp. 307, 309, 312).

The Mongolian Race includes the Lapps in Europe, the native inhabitants of Central and Northern Asia, and the dense population of China, Japan, Indo-China, and the East Indies (see pp. 124, 188). The natives of America, who may be a branch of the Mongolian race, are numerically a small body now in North America, and in South America have largely intermarried with Caucasian immigrants (see p. 229).

The Negro Race includes the native inhabitants of Africa south of the Sahara, and the descendants of the slaves imported into the United States and West Indies (see p. 290). To the Negrito branch of the Negro race belong the inhabitants of New Guinea and the Melanesian Isles, and possibly a few scattered tribes in South-East India and the East Indies (see pp. 188, 308, 309).

TABLES OF MEAN TEMPERATURE AND RAINFALL OF TOWNS IN THE BRITISH ISLES.

The Temperature is given in Degrees Fahrenheit and the Rainfall in Inches.

	Aberdeen.	Belfast.	Ben Nevis.	Birmingham.	Cambridge.	Clifton (Bristol).	Dover.	Dublin.	Edinburgh.	Falmouth.	Fort William.	Glasgow.
Latitude in degrees, north	57·10	54·40	56·50	52·30	52·10	51·20	51·10	53·20	56·0	50·10	56·50	55·50
Altitude in feet	102	66	4,400	500	40	228	46	51	270	211	30	180
Temperature, January	37	40	24	37	39	39	40	42	37	44	39	38
Temperature, July	58	60	40	62	64	62	63	60	58	61	58	58
Mean annual range of temperature	21	20	14	25	25	23	23	18	21	17	19	20
*Winter rainfall	8	8	**77**	6	4	8	7	6	5	12	**27**	9
*Spring rainfall	6	7	53	6	5	7	5	6	5	9	14	7
*Summer rainfall	7	8	40	7	6	9	6	7	7	9	15	9
*Autumn rainfall	**8**	**10**	46	**7**	**7**	**10**	**10**	**8**	**7**	**14**	24	**10**
Mean annual rainfall	29	33	216	26	22	34	28	27	24	44	80	35

	Liverpool.	London (Greenwich).	Manchester.	Oxford.	Scarborough.	Seathwaite.	Sheffield.	Southampton.	Valentia Isle.	Wick.	Yarmouth.	York.
Latitude in degrees, north	53·20	51·30	53·30	51·50	54·20	54·20	53·30	50·50	51·50	58·30	52·40	54·0
Altitude in feet	30	155	126	210	130	422	117	78	23	77	12	50
Temperature (January)	41	38	38	39	38	38	38	41	45	38	38	37
Temperature (July)	62	63	59	62	59	58	58	63	59	56	61	60
Mean annual range of temperature	21	25	21	23	21	20	20	22	14	23	23	23
Winter rainfall	6	5	8	6	6	**59**	**11**	8	**17**	7	5	6
Spring rainfall	6	5	7	6	6	27	6	6	12	6	5	6
Summer rainfall	8	**7**	**12**	6	7	30	7	7	12	7	7	**7**
Autumn rainfall	**10**	6	7	**7**	**8**	18	7	**8**	15	**8**	**8**	6
Mean annual rainfall	30	23	34	25	27	134	31	29	56	28	25	25

* Winter = December, January, February. Spring = March, April, May. Summer = June, July, August.

TABLES OF MEAN TEMPERATURE AND MEAN RAINFALL OF TOWNS IN EUROPE.

	Amsterdam.	Archangel.	Astrakhan.	Athens.	Barcelona.	Bergen.	Berlin.	Berne.	Bologna.	Breslau.	Brest.	Brussels.
Latitude in degrees, north	52	65	46	38	41	60	53	47	44	51	48	60
Altitude in feet	30	33	66	361	138	49	157	1,880	279	483	210	187
Temperature (January)	36	8	21	52	48	34	33	29	34	29	43	37
Temperature (July)	64	61	78	79	76	58	67	65	76	66	64	66
Mean annual range of temperature ..	28	53	57	27	28	24	34	36	42	37	21	29
Winter rainfall	7	3	1	9	4	22	5	7	8	3	11	7
Spring rainfall	4	2	2	4	5	14	5	7	7	5	7	6
Summer rainfall	7	6	2	2	4	15	7	12	6	9	6	8
Autumn rainfall	9	5	1	3	8	25	6	12	8	6	9	9
Mean annual rainfall	27	16	6	18	21	76	23	38	29	23	33	30

	Budapest.	Bukarest.	Christiania.	Constantinople.	Copenhagen.	Cracow.	Davos.	Debreczin.	Florence.	Genoa.	Gibraltar.	Great St. Bernard Hostel.
Latitude in degrees, north	47	44	60	41	56	50	47	47	44	44	36	46
Altitude in feet	502	305	135	230	43	700	5,115	453	249	177	49	8,130
Temperature (January)	29	26	24	42	32	25	47	27	41	45	56	17
Temperature (July)	71	74	63	74	62	62	50	71	76	75	72	45
Mean annual range of temperature ..	42	48	39	32	30	37	3	44	35	30	16	28
Winter rainfall	6	5	4	11	5	4	6	6	12	17	15	10
Spring rainfall	5	5	3	6	4	5	6	4	8	13	11	10
Summer rainfall	7	8	7	4	6	13	17	9	6	7	2	13
Autumn rainfall	6	5	9	7	7	4	7	6	11	14	5	16
Mean annual rainfall	24	23	23	28	22	26	36	25	37	51	33	49

TABLES OF MEAN TEMPERATURE AND MEAN RAINFALL OF TOWNS IN EUROPE.

	Hamburg.	Lisbon.	Lyons.	Madrid.	Marseilles.	Milan.	Moscow.	Munich.	Naples.	Odessa.	Palermo.	Paris.
Latitude in degrees, north	54	39	46	40	43	45	56	48	41	46	38	49
Altitude in feet	64	335	637	2,149	246	480	509	1,734	489	214	327	256
Temperature (January)	33	51	33	40	44	33	13	28	47	26	52	37
Temperature (July)	63	70	67	77	72	76	66	64	78	73	76	66
Mean annual range of temperature	30	19	34	30	28	43	53	36	31	47	24	29
Winter rainfall	7	**11**	4	**5**	**7**	8	3	5	13	3	**11**	4
Spring rainfall	5	10	5	5	5	9	5	9	9	4	7	5
Summer rainfall	**9**	3	**8**	3	3	9	**7**	**14**	3	**5**	1	**6**
Autumn rainfall	8	5	4	3	7	**12**	5	8	**15**	4	10	6
Mean annual rainfall	29	29	21	16	22	38	20	36	40	16	29	21

	Perm.	Rome.	St. Petersburg.	Sofia.	Stettin.	Stockholm.	Trieste.	Tromsoe.	Venice.	Vesturanna (Iceland).	Vienna.	Warsaw.
Latitude in degrees, north	58	42	60	43	53	59	46	70	45	63	48	52
Altitude in feet	328	163	19	1,764	128	146	85	50	69	(?)	664	392
Temperature (January)	2	45	17	29	31	27	40	26	37	35	30	26
Temperature (July)	65	77	63	73	66	62	76	52	76	51	68	67
Mean annual range of temperature	63	32	46	44	35	35	36	26	39	16	38	41
Winter rainfall	3	**11**	3	4	4	3	9	**12**	6	**24**	5	4
Spring rainfall	4	7	3	4	4	2	8	11	6	12	6	5
Summer rainfall	**7**	4	**7**	**8**	**7**	5	11	7	9	6	**8**	**9**
Autumn rainfall	5	8	5	6	6	**6**	**14**	11	**9**	18	6	5
Mean annual rainfall	19	30	18	22	21	16	42	41	30	60	26	23

TABLES OF MEAN TEMPERATURE AND RAINFALL OF TOWNS IN ASIA.

	Aden.	Allahabad.	Baghdad.	Baku.	Bangkok.	Batavia.	Beirut.	Bombay.	Bushire.	Calcutta.	Canton.	Cherra Punji.
Latitude in degrees, north	12	25	33	40	13	6	33	19	28	22	23	25
Altitude in feet	90	310	40	10	0	20	110	40	26	20	40	4,450
Temperature (January)	75	61	50	39	76	76	57	74	57	67	55	(?)
Temperature (July)	84	85	95	80	81	78	79	81	89	83	82	(?)
Mean annual range of temperature ..	9	24	45	41	5	2	22	7	32	16	27	(?)
Winter rainfall	1	2	**6**	**3**	1	**33**	**21**	0	**10**	1	6	3
Spring rainfall	**2**	1	3	2	14	19	7	0	2	9	25	96
Summer rainfall	0	**28**	0	1	22	8	0	**69**	0	**39**	**29**	**305**
Autumn rainfall	0	9	1	3	**23**	12	8	16	2	16	8	67
Mean annual rainfall	3	40	10	9	60	72	36	85	14	65	68	471

	Colombo.	Darjiling.	Hué.	Ichang.	Irkutsk.	Karachi.	Kashgar.	Lahore.	Leh.	Madras.	Mandalay.	Manila.
Latitude in degrees, north	6	27	16	30	52	24	39	31	33	13	21	14
Altitude in feet	40	7,420	20	500	1,540	50	4,060	730	11,500	20	500	50
Temperature (January)	79	40	67	40	−7	65	21	55	19	75	70	77
Temperature (July)	81	61	83	80	66	84	82	89	64	85	86	80
Mean annual range of temperature ..	2	21	16	40	73	19	61	34	45	10	16	3
Winter rainfall	11	2	18	3	3	1	0	3	1	7	0	4
Spring rainfall	29	14	7	12	2	0	**2**	2	1	3	7	6
Summer rainfall	16	**83**	10	**21**	**8**	**6**	1	**14**	**1**	11	**14**	**39**
Autumn rainfall	**32**	23	**70**	10	4	1	0	3	1	**30**	13	28
Mean annual rainfall	88	122	105	46	17	8	3	22	4	51	34	77

TABLES OF MEAN TEMPERATURE AND RAINFALL OF TOWNS IN ASIA—*Continued.*

	Maskat.	Niigata.	Peking.	Peshawar.	Poona.	Potl.	Quetta.	Rangoon.	Shanghai.	Simla.	Singapore.	Smyrna.
Latitude in degrees, north	23	37	40	34	18	42	30	16	31	31	1	38
Altitude in feet	30	30	120	1,110	1,850	20	5,500	40	0	7,220	20	26
Temperature (January)	69	35	23	51	72	42	41	75	38	40	80	47
Temperature (July)	87	74	79	89	75	74	77	78	82	65	82	80
Mean annual range of temperature ..	18	39	56	38	3	32	36	3	44	25	2	33
Winter rainfall	**4**	17	0	3	1	15	**5**	1	6	8	25	**12**
Spring rainfall	1	12	3	**4**	2	9	3	13	11	9	21	7
Summer rainfall	0	16	**19**	4	**17**	**23**	1	**60**	**18**	**46**	22	1
Autumn rainfall	1	**23**	4	2	10	19	1	27	11	8	**26**	7
Mean annual rainfall	6	68	26	13	30	66	10	101	46	71	94	27

	Tashkent.	Teheran.	Tiflis.	Tobolsk.	Tokyo.	Tomsk.	Trebizond.	Trinco-mali.	Urga.	Verkho-yansk.	Vladi-vostok.	Yakutsk.
Latitude in degrees, north	41	35	41	58	35	56	41	8	47	67	43	61
Altitude in feet	1,520	3,710	1,340	360	70	250	90	170	4,300	460	60	330
Temperature (January)	30	36	34	−2	37	−4	41	78	−17	−61	7	−45
Temperature (July)	82	(?)	77	68	75	68	75	84	65	59	67	66
Mean annual range of temperature ..	52	(?)	43	70	38	72	34	6	82	120	60	111
Winter rainfall	5	**6**	2	2	7	2	10	22	0	0	0	2
Spring rainfall	**6**	4	6	3	15	2	8	6	0	0	3	2
Summer rainfall	0	0	**6**	**10**	18	**8**	7	8	**7**	**3**	**8**	**6**
Autumn rainfall	2	2	5	4	**22**	3	**11**	**26**	1	1	4	3
Mean annual rainfall	13	12	19	19	62	15	36	62	8	4	15	13

TABLES OF MEAN TEMPERATURE AND MEAN RAINFALL OF TOWNS IN CANADA AND THE UNITED STATES.

	Augusta (Georgia).	Boston.	Buffalo.	Chicago.	Denver.	Fort Chippewyan.	Edmonton.	Halifax.	Montreal.	New Orleans.	New Westminster.	New York.
Latitude in degrees, north	35	42	43	42	39	—	54	45	45	30	49	41
Altitude in feet	183	142	696	661	5,294	700	2,388	122	187	52	54	164
Temperature (January)	48	27	24	25	28	15	11	22	13	54	34	30
Temperature (July)	82	71	70	73	73	61	61	63	70	82	61	74
Mean annual range of temperature	34	44	46	48	45	46	50	41	57	28	28	44
Winter rainfall	12	11	9	7	2	1	2	**17**	10	14	**24**	10
Spring rainfall	12	**12**	9	9	**6**	1	4	13	9	15	15	11
Summer rainfall	**15**	11	10	**10**	4	**4**	**9**	11	9	**19**	8	**13**
Autumn rainfall	9	12	**11**	8	2	3	3	14	**11**	12	17	11
Mean annual rainfall	48	46	39	34	14	9	18	55	39	60	64	45

	Omaha.	Portland (Oregon).	Quebec.	St. John's (Newfoundland).	St. Louis.	St. Paul.	San Diego.	San Francisco.	Salt Lake City.	Upernavik (Greenland).	Winnipeg.	York Factory (Keewatin).
Latitude in degrees, north	41	45	47	48	39	45	33	38	41	72	50	58
Altitude in feet	1,113	67	313	150	571	801	67	60	4,348	39	740	55
Temperature (January)	21	39	9	24	31	12	53	50	29	−6	−5	−22
Temperature (July)	76	67	66	60	78	72	68	58	76	40	66	61
Mean annual range of temperature	55	28	57	36	47	60	15	8	47	46	71	83
Winter rainfall	2	**21**	10	13	8	3	**6**	**14**	5	1	2	1
Spring rainfall	9	11	8	13	12	8	2	6	**6**	2	7	4
Summer rainfall	**13**	3	**11**	12	**12**	**11**	0	0	3	2	**10**	**18**
Autumn rainfall	7	12	10	**15**	9	6	1	4	4	**3**	4	7
Mean annual rainfall	31	47	39	53	41	28	9	24	18	8	23	30

TABLES OF MEAN TEMPERATURE AND MEAN RAINFALL OF TOWNS IN MEXICO, AND CENTRAL AND SOUTH AMERICA.

	Asuncion.	Bahia.	Belize.	Bogota.	Buenos Aires.	Caracas.	Chubut (Patagonia)	Colon.	Copiapo.	Georgetown.	Havana.	Kingston.
Latitude in degrees	25 S.	13 S.	18 N.	5 N.	35 S.	10 N.	43 S.	9 N.	27 S.	6 N.	23 N.	18 N.
Altitude in feet	322	330	27	8,727	12	3,043	98	164	1,296	10	62	10
Temperature (January)	86	83	76	6	76	68	70	79	69	79	73	76
Temperature (July)	64	75	82	56	50	72	42	79	51	79	84	82
Mean annual range of temperature ..	22	8	6	50	26	4	28	0	18	0	11	6
Winter rainfall	**19**	13	16	13	9	2	2	15	0	23	7	4
Spring rainfall	16	**35**	6	21	**10**	3	2	16	0	23	9	8
Summer rainfall	8	25	26	9	6	**13**	**3**	43	0	**28**	**16**	12
Autumn rainfall	15	17	**31**	**21**	9	**13**	2	**50**	0	7	15	**14**
Mean annual rainfall	58	90	79	64	34	31	9	124	0	81	47	38

	Lima.	Manaos.	Mendoza.	Mexico.	Monte Video.	Para.	Punta Arenas (Straits of Magellan).	Quito.	Rio Janeiro.	Santiago (Chile).	Valdivia (Chile).	Vera Cruz.
Latitude in degrees	12 S.	3 S.	33 S.	19 N.	35 S.	1 S.	53 S.	0	23 S.	33 S.	40 S.	19 N.
Altitude in feet	499	121	2,641	7,490	39	0	33	9,350	224	1,703	43	26
Temperature (January)	74	78	73	54	73	80	51	56	79	69	59	70
Temperature (July)	57	78	46	62	52	81	35	54	70	48	44	83
Mean annual range of temperature ..	17	0	27	8	21	1	16	2	9	21	15	13
Winter rainfall	0	29	**3**	1	9	23	4	11	**15**	0	11	3
Spring rainfall	0	**33**	2	3	12	**34**	6	**17**	14	3	32	5
Summer rainfall	**1**	11	1	**13**	10	12	**7**	4	5	**7**	**55**	**37**
Autumn rainfall	**1**	13	1	6	**13**	7	4	10	10	2	18	24
Mean annual rainfall	2	86	7	23	44	76	21	42	44	12	116	69

TABLES OF MEAN TEMPERATURE AND MEAN RAINFALL OF TOWNS IN AFRICA.

	Algiers.	Biskra.	Bloemfontein.	Cairo.	Cape Town.	Gondar.	Graaf Reinet.	Khartum.	Lado.	Lagos.	Loanda.	Lourenço Marques.
Latitude in degrees	36 N.	35 N.	29 S.	30 N.	33 S.	12 N.	32 S.	16 N.	5 N.	6 N.	8 S.	26 S.
Altitude in feet	73	409	4,550	108	37	7,422	2,500	1,273	1,526	25	194	16
Temperature (January)	54	52	73	54	70	67	74	67	82	79	77	80
Temperature (July)	77	90	47	85	55	62	52	92	77	77	66	66
Mean annual range of temperature ..	23	38	26	31	15	5	22	25	5	2	11	14
Winter rainfall	**12**	2	**11**	**1**	2	0	**16**	(?)	0	5	3	**16**
Spring rainfall	6	**3**	6	0	7	3	5	(?)	10	22	**8**	5
Summer rainfall	1	0	1	0	**11**	**32**	1	(?)	**20**	**26**	0	1
Autumn rainfall	8	2	5	0	5	10	4	(?)	8	17	2	4
Mean annual rainfall	27	7	23	1	25	45	26	(?)	38	70	13	26

	Maritzburg.	Massaau (Eritrea).	Port Elizabeth.	Pretoria.	St. Louis.	Sierra Leone.	Teneriffe (Canary Isles).	Tete (Port. E. Africa).	Tripoli.	Vivi (Belgian Congo).	Walfisch Bay.	Zanzibar.
Latitude in degrees	29 S.	15 N.	34 S.	25 S.	16 N.	8 N.	28 N.	16 S.	33 N.	5 S.	22 S.	5 S.
Altitude in feet	2,093	31	181	4,462	16	224	1,790	250	98	374	10	23
Temperature (January)	72	77	71	74	70	82	56	85	58	78	65	82
Temperature (July)	56	94	57	59	81	80	70	73	79	71	58	77
Mean annual range of temperature ..	16	17	14	15	11	2	14	12	21	7	7	5
Winter rainfall	**15**	**5**	4	**15**	0	2	**7**	**19**	**8**	14	0	14
Spring rainfall	8	1	6	5	0	20	2	10	2	**15**	0	**33**
Summer rainfall	2	1	6	1	**11**	**98**	0	0	0	0	0	6
Autumn rainfall	10	1	**7**	7	6	52	3	5	4	12	0	12
Mean annual rainfall	35	8	23	28	17	172	12	34	14	41	0	65

TABLES OF MEAN TEMPERATURE AND MEAN RAINFALL OF TOWNS IN AUSTRALIA AND OCEANIA.

	Adelaide.	Albany.	Alice Springs.	Apia (Samoa).	Auckland.	Bathurst.	Bourke.	Brisbane.	Cape York.	Christchurch.	Dunedin.	Eucla.
Latitude in degrees, south	36	35	24	13	36	33	30	27	11	43	45	31
Altitude in feet	140	88	2,100	0	258	2,200	456	130	70	21	500	7
Temperature (January)	75	65	85	79	67	73	84	78	81	62	58	70
Temperature (July)	51	56	53	75	52	43	51	59	77	42	42	54
Mean annual range of temperature ..	24	9	32	4	15	30	33	19	4	20	16	16
Winter rainfall	2	3	**5**	**55**	9	**7**	**8**	**20**	**50**	5	9	1
Spring rainfall	6	9	2	29	10	6	4	16	29	6	9	**4**
Summer rainfall	**8**	**15**	1	15	**14**	6	2	9	2	**7**	**9**	3
Autumn rainfall	5	8	1	28	10	6	4	9	2	5	8	2
Mean annual rainfall..	21	35	9	127	43	25	18	54	83	23	35	10

	Geraldton.	Hobart.	Hokitika, New Zealand.	Mackay.	Melbourne.	Port Darwin.	Perth.	Rockhampton.	Sydney.	Tahiti (Society Isles).	Wellington.	Wentworth.
Latitude in degrees, south	28	43	42	21	37	12	32	23	34	18	41	34
Altitude in feet	5	37	12	200	91	70	47	0	155	0	140	144
Temperature (January)	73	61	60	81	66	85	76	82	72	78	62	79
Temperature (July)	57	47	45	62	47	78	55	57	52	75	47	50
Mean annual range of temperature ..	16	14	15	17	19	7	21	25	19	3	15	29
Winter rainfall	1	5	30	**37**	6	**40**	1	**22**	12	**19**	10	2
Spring rainfall	4	5	29	28	6	16	8	10	**16**	13	11	4
Summer rainfall	**11**	6	**31**	6	6	0	**18**	5	13	5	**17**	3
Autumn rainfall	2	**7**	29	6	**8**	7	6	6	9	9	13	**4**
Mean annual rainfall	18	23	119	77	26	63	33	43	50	46	51	13

AREA AND POPULATION OF THE CHIEF COUNTRIES OF EUROPE.

Year of Census or Estimate.	Country.	Area in 1,000 Square Miles.	Population of Country in Thousands.	Chief Town.	Population of Town, with Suburbs in Thousands.
1910	Austria	116	28,321	Vienna	2,031
1910	Hungary	125	20,840	Budapest	880
1910	Bosnia Herzegovina	19	1,898	Serajevo	38
1910	Belgium	11	7,516	Brussels	665
1910	Bulgaria and East Roumelia	37	4,329	Sofia	102
1911	Denmark	15	2,775	Copenhagen	559
1911	France	207	39,601	Paris	2,888
1910	German Empire	209	64,903	Berlin	2,070
1907	Greece	25	2,631	Athens	167
1910	Holland	13	5,945	Amsterdam	573
1910	Iceland	39	85	Reikjavik	3
1911	Italy	111	34,686	Rome	538
1910	Luxemburg	1	259	Luxemburg	21
?	Montenegro	4	250	Cetigne	4
1910	Norway	124	2,391	Christiania	241
1900	Portugal	35	5,423	Lisbon	356
1910	Roumania	51	6,966	Bukarest	276
1910	Russia in Europe, including Finland	1,996	138,889	St. Petersburg	1,907
1910	Servia	19	2,911	Belgrade	90
1910	Spain	195	19,588	Madrid	571
1910	Sweden	173	5,521	Stockholm	341
1910	Switzerland	16	3,741	Berne	85
?	Turkey in Europe	65	6,130	Constantinople	1,106
1910	United Kingdom	121	45,216	London ('greater')*	7,537
	England	51	34,428	,, ,,	,,
	Scotland	30	4,759	Edinburgh†	320
,,	,, ,, Ireland	32	4,381	Dublin‡	309
	Wales	7	1,647	Cardiff	182

* Liverpool, 746,566; Manchester, 714,427; Birmingham 525,960; Sheffield, 454,650; Leeds, 445,568; Bristol, 357,059.
† Glasgow, 783,400. ‡ Belfast, 385,492.

AREA AND POPULATION OF THE CHIEF COUNTRIES IN ASIA.

Year of Census or Estimate.	Country.	Area in 1,000 Square Miles.	Population of Country in Thousands.	Largest City.	Populati City Thousa
1910	Siberia*	4,787	8,220	Irkutsk†	108
,,	Steppes	711	3,282	—	—
,,	W. Turkistan and Trans-Caspian Province ..	614	6,690	Tashkent	201
,,	Trans-Caucasia	95	6,695	Baku‡	178
,,	Total Asiatic Russia ..	6,207	24,889	—	—
A recent estimate	Asia Minor and Armenia	265	12,979	Smyrna	350
,,	Syria	115	3,675	Damascus	350
,,	Mesopotamia	143	2,000	Baghdad	200
,,	Turkish Arabian Provinces	170	1,050	Mecca	80
,,	Total Asiatic Turkey ..	693	17,682	—	—
An estimate	Arabian Province of Oman	82	500	Maskat	25
A recent estimate	Persia	628	9,500	Teheran	280
An estimate	Afghanistan	250	5,900	Kabul	140
,,	China Proper	1,532	407,253	Canton§	900
,,	Manchuria	364	16,000	Mukden	160
,,	Mongolia	1,368	2,600	Urga	12
,,	Tibet	463	6,500	Lhasa	15–2
,,	Chinese Turkistan ..	550	1,200	Kashgar	50
,,	Total Chinese Empire ..	4,277	433,553	—	—
,,	Korea	86	13,125	Seoul	278
1911	The Japanese Empire**	161	54,983	Tokyo‖	2,186
,,	The Indian Empire ..	1,767	315,132	Calcutta¶	1,222
,,	Ceylon	25	3,592	Colombo	158
An estimate	Siam	195	6,687	Bangkok	400–6
1906	French Indo-China ..	256	16,315	Hanoi	150
1905	Java	50	30,098	Batavia	138
,,	Total Dutch East Indies	736	38,000	—	—
1910	The Philippines	128	8,276	Manila	234

* Almost 16 per cent. of the total population of Siberia belong to the Mongolo-Tartar race the rest to the Caucasic. Nearly 5 per cent. of the population are exiles from Russia.

† Tomsk, 107,000. ‡ Tiflis, 196,000.

§ Singan and Siangtan are doubtfully credited with a million each; Tientsin from 750 to 900,000; Chengtu, 800,000; Peking, 700,000; Chungking, 600,000; Shanghai, 650,000

‖ Ozaka, 996,000. ¶ Bombay, 979,000; Madras, 518,000; Delhi, 232,8

** Including Formosa and excluding Korea.

AREA AND POPULATION OF THE CHIEF COUNTRIES OF AFRICA.

Year of Census.	Country.	Area in 1,000 Square Miles.	Population of Country in Thousands.	Largest City.	Population of City in Thousands.
An estimate	Abyssinia	200	4,500	Harrar	50
An estimate	Belgian Congo	900	9–16,000	Boma	?
An estimate	Tripoli	399	1,000	Tripoli	30
1907	Egypt	400	11,287	Cairo*	654
An estimate	Egyptian Sudan	950	2,000	Omdurman	41
An estimate, 1911	Nigeria, North and South	330	17,000	Ibadan	200
An estimate	British East Africa	177	4,038	Mombasa	30
1911	Nyasaland and Rhodesia	478	2,737	Blantyre	6
1911	Transvaal and Swaziland	117	1,775†	Johannesburg‡	237
1911	Orange Free State Province	50	526§	Bloemfontein	26
1911	Province of Natal and Zululand	35	1,191‖	Durban¶	72
1911	Province of the Cape of Good Hope	277	2,563**	Cape Town	67
1911	Algeria and Tunis	393	7,486	Tunis††	177
An estimate	Morocco	219	5,000	Fez	140
An estimate, 1906	French Equatorial Africa	669	5,000	Libreville	?
1907	Madagascar	228	2,706	Antananarivo	65
An estimate	Kamerun	291	3,303	—	—
An estimate	German East Africa	384	10,000	Tabora	37
An estimate	German South-West Africa	322	83	—	—
An estimate	Portuguese East Africa	293	3,120	Lourenço Marques	10
An estimate, 1906	Portuguese West Africa (Angola)	485	4,119	Loanda	15

* Alexandria, 332,000. † Of which 422,000 are of European origin. ‡ Pretoria, 48,609. § 142,000 being of European origin.
‖ 92,000 being of European origin. ¶ Maritzburg, 31,000. ** 583,000 being of European origin. †† Algiers, 188,000.

AREA AND POPULATION OF THE STATES OF AUSTRALIA AND OF NEW ZEALAND.

Year of Census.	Country.	Area in 1,000 Square Miles.	Population of Country in Thousands.	Largest City.	Population of City in Thousands.
1911	New South Wales	310	1,648	Sydney	621
1911	Victoria	87	1,315	Melbourne	591
1911	Queensland	670	605	Brisbane	143
1911	S. Australia and Northern Territory	903	411	Adelaide	192
1911	Western Australia	976	282	Perth	54
1911	Tasmania	26	191	Hobart	27
1911	New Zealand	105	1,008	Auckland and Suburbs††	102

N.B.—There are probably about 17,000 aborigines in Australia and 49,000 Maoris in New Zealand. †† Christchurch, 80,000; Wellington, 70,000.

AREA AND POPULATION OF THE CHIEF COUNTRIES IN AMERICA.

Year of Census or Estimate.	Country.	Area in 1,000 Square Miles.	Population of Country in Thousands.	Largest City.	Population of City with Suburbs in Thousands
1911	British North America*	3,659	7,438	Montreal† ..	466
1910	United States‡ ..	2,970	91,272	New York§ (1910)	4,766
1910	Alaska	590	64	—	—
1910	Mexico	767	15,063	Mexico	470
1911	Argentina	1,135	7,171	Buenos Aires ..	1,329
1910	Bolivia	708	2,267	La Paz ..	78
1900	Brazil	3,218	17,318	Rio de Janeiro	750
1911	British Guiana ..	90	296	Georgetown ..	53
1910	Chile	307	3,329	Santiago ..	332
1908	Colombia	435	4,303	Bogota	100
1910	Ecuador	116	1,500	Quito	70
1910	Paraguay	171	752	Ascuncion ..	84
1908	Peru	695	4,500	Lima	140
1909	Uruguay	72	1,094	Montevideo ..	291
1911	Venezuela	364	2,713	Caracas ..	72

* The English-speaking population of Canada numbers 3,721,000, and th French-speaking 1,649,000. The native Indians number 110,000.

† Toronto, 376,000; Quebec, 78,000; Ottawa, 86,000; Winnipeg, 135,000.

‡ In the United States in 1900 the whites numbered 66,893,000; the negroes 8,840,000; the native Indians, 237,000; and the Chinese, 90,000.

§ Chicago, 2,185,000; Philadelphia, 1,549,000; St. Louis, 687,029; Boston 670,585; Baltimore, 558,485.

AREA AND POPULATION OF THE CONTINENTS.

Continent.	Areas in 1,000 Square Miles.	Population in Thousands.
Europe	3,834	416,000
Asia	16,881	928,709
North America ..	8,582	115,042
South America ..	6,864	41,377
Africa	11,348	151,000
Australasia	3,077	4,862

INDEX

NOTE.—*Where two or more references are given, the first is the most important.*

AACHEN, 85
Aar, R., 81
Abana, R., 144
Aberdare, 33
Aberdeen, 14-15, 338
Aberystwyth, 32, 33
Abyssinia, 258-259, 254, 349
Abyssinians, 290
Accra, 266
Achill Island, 56
Aconcagua, Mt., 240
Addis Abeba, 259
Adelaide, 299, 346, 349
Aden, 147, 258, 341
Adige, R., 115
Adriatic Sea, 108
Ægean Sea, 108
Ægir, 39
Afghanistan, 153, 348
Africa, 244-291, 345, 349, 350; configuration, 244; river system, 285; lakes, 285-286; climate, 286-287; vegetation, 286-287; fauna, 288-289; races, 289-290
Africa, South, 276-284
Agra, 174
Ainu, 166
Air, 250
Aire gap, 22
Aire, R., 22, 25, 26
Alaska, 205, 204, 220, 350
Albany, 210, 296, 346
Albert, L., 252. 271, 273
Alberta, 202, 203
Albury, 299
Alderney, 51
Aleutian Isles, 204
Alexandria, 256, 349
Alexandrina, L., 299
Alfa, 112, 245
Algeria, 247, 349
Algiers, 247, 345, 349
Algoa Bay, 283
Alice Springs, 346
Allahabad, 174, 341
Alleghany, 212
Alleghany Plateau, 211
Allen, L., 55
Allier, R., 75
Alluvial soil, 63]
Almaden, 110
Almeria, 112
Alpineland, 78-80
Alps, 78-80, 113
Alsace, 82
Altai Mts., 150, 134
Altona, 87
Amadeus, L., 296
Amazon, R., 234
America, British North, 193-205, 350
America, Central, 220-223, 344
America, discovery of, 189-192
America, North, 189-230; configuration, 192; relief, 225; river system, 226; climate, 227-228; vegetation, 227-228; fauna, 228-229; population, 229-230
America, South, 231-243, 344, 350; configuration and political divisions, 231; climate, 242; vegetation 242; fauna, 243
Amerigo Vespucci, 190
Amiens, 73
Amritsar, 172
Amsterdam, 90, 339, 347
Amu, R., 137, 138
Amur, R., 132
Anam, 180
Andaman Isles, 188
Andes, 239-240, 231, 232
Angara, R., 132
Anglesey, 32
Angola, 268, 349
Animals and vegetation, 331; protective colouring of, 331; of economic value, 332
Annan, R., 18
Annobon, 266
Antananarivo, 275, 349
Anti-Atlas Mts., 245
Anticyclones, 7
Anti-Lebanon, 141
Anti-Taurus Mts., 140
Antilles, Greater and Lesser, 223
Antrim, 57
Ants, white, 288, 260
Antwerp, 91
Apennines, 116, 113, 115, 121
Apia, 346
Appalachian Mts., 206-211
Appleby, 28
Arabia, 147-149
Arabs, 149, 188, 289, 290
Aral, Sea of, 136
Aran Islands, 56
Ararat, Mt., 140
Aras, R., 140
Aravalli Hills, 175
Arbroath, 16
Archangel, 98, 339
Arctic Circle, 4
Arctic Ocean, 3
Ardennes, 91
Ardrossan, 18
Argentina, 236-238, 232, 350
Argun, R., 132
Argyll, 13
Arkansas, R., 214
Armenia, 140, 141, 348
Armenians, 141, 188
Arnheim Peninsula, 297
Arno, R., 116
Arran, 127
Artesian wells, 285, 246, 298, 302
Arthur's Seat, 18
Ascension Isle, 268
Ashanti, 266
Asia, 128-188, 341-342, 348-350; relief, 183; river system, 184; climate, 184-186; vegetation, 184-186; fauna, 186, 187; population, 187; race, 187
Asia Minor, 140-141, 348
Assam, 168, 170, 174
Assuan, 255, 254, 256
Assyria, 144
Astrakhan, 100, 339
Asuncion, 238, 344, 350
Atacama Desert, 240
Atbara, R., 258, 254, 260
Athabasca, L., 202
Athens, 121, 339, 347
Athlone, 50
Atlantic Ocean, 317
Atlas, Great and Little, Mts., 245
Atolls, 225, 309
Auckland, 311, 346, 349
Augusta, 212, 343
Australasia, 350
Australia, 292-308, 346, 349; position, shape and discovery, 292-294; relief and political divisions, 294; climate and vegetation, 305-306; fauna, 307; population, 307; commerce, 308
Australia, Commonwealth of, 294
Australian Alps, 303, 299
Australian Province, 306, 331
Austria, 347
Austria-Hungary, 102-106
Auvergne Mts., 74
Avignon, 76
Avoca, R., 58
Avon, Lower, R., 36, 37
Avon, Upper, R., 38, 36
Avonmouth, 37
Awe, L., 12
Aylesbury, 43
Ayr, 18
Azores, 248

Bab-el-Mandeb Straits, 148
Babylon, 146
Babylonia, 144
Back, R., 196
Baffin Land, 192, 227
Baghdad, 146, 341, 348
Baghdad Railway, 140
Bahamas, 224
Bahia, 236, 344
Bahr-el-Ghazal, R., 252, 260
Bahr Yusuf, 254, 255
Bahrein Isles, 148
Baikal, L., 132
Baku, 101, 341, 348
Bala, L., 33
Balearic Isles, 108
Balkan Mts., 107, 121
Balkhash, L., 136, 137
Ballarat, 304
Balmoral, 14
Baltic Plain, 99
Baltic Sea, 2, 87, 88, 92, 96, 98, 320
Baltimore 211, 350
Baluchistan, 153
Bamboo, 164
Bana, 270
Bananas, 221, 273, 274
Bandon, R., 58
Banff, 14
Bangkok, 180, 341, 348
Bangor, 32
Bangweolo, L., 268, 271, 274
Banka, 182
Banks peninsula, 312
Bantry Bay, 95
Bantu negroes, 290
Bann, R., 57
Bannockburn, 16
Barada, R., 144
Barbados, 223
Barbary States, 246
Barberton, 280
Barcelona 112, 339
Barka, 252
Barley, 328
Barnstaple Bay, 50
Barren Lands, 198
Barrier Range, 298
Barrier Reef, 292
Barrow, 29
Barrow, R., 58

Barry, 33
Basle, 81
Bass Strait, 305, 294
Basutoland, 281
Batavia, 182, 341, 348
Bath, 37
Bathurst, 264, 300,346
Batum, 101
Bavaria, 84
Beachy Head, 46
Beasts of burden, 332
Beaumaris, 32
Bechuanaland, 279, 282
Bedford, 40, 41
Bedfordshire, 41
Beduins, 149, 289
Beechworth, 304
Beet-sugar, 328
Beira, 278, 279
Beirut, 142, 144, 341
Belfast, 57, 338, 347
Belfast, L., 57
Belgian Congo,268-270, 349
Belgium, 90-91, 347
Belgrade, 107, 347
Belize, 222, 344
Belle Isle, Straits of, 194
Belt, Great, 92
Belt, Little, 92
Ben Nevis, 11, 338
Benares, 174
Bendigo, 304
Bengal, 173-174, 168
Benghazi, 252
Benguela current, 320
Benue, R., 261
Berbera, 258
Berbers, 246, 236, 289
Bergen, 94, 339
Bering Sea, 205
Bering Straits, 128, 189
Berkeley Ship Canal, 37
Berlin, 86, 339, 347
Bermudas, 225, 224
Berne, 81, 347, 339
Bernese Alps, 79
Berwick, 21
Berwyn Mts., 33
Betel nuts, 178
Bhutan, 168
Biafra, Bight of, 266
Bilbao, 112
Billiton, 182
Bir es Seb'a, 143
Birkenhead, 30
Birmingham (Eng:),39, 338, 347
Birmingham (U.S.A.), 211
Biscay, Bay of, 70
Biskra, 247, 345
Bismarck Archipelago, 308
Black Country, the, 38
Black earth (of Russia), 101
Black earth (of India), 176
Black Forest, 82
Black Mts., 33
Black Sea, 101
Blackburn, 30
Blackpool, 29
Blackwater, R. (English), 42
Blackwater, R. (Irish), 58
Blanc, Mont, 79
Blantyre, 275, 349
Bloemfontein, 281, 345, 349
Blue Mts., 303, 300
Blue Ridge, 210
Bodmin, 750
Boers, 280, 289
Bog of Allen, 53, 55
Bogota, 239, 344, 350
Bogs, Irish, 53, 56
Bogs of Scotland, 11
Bohemia, 102
Böhmer Wald, 81
Bokhara, 138
Bolan Pass, 153, 169
Bolivia, 239-240, 350
Bologna, 116, 339
Bolton, 29, 30
Boma, 349
Bombay, 177, 168, 341, 348
Bonn, 84
Bordeaux, 75, 78
Bore, 2, 37
Borneo, 182, 181
Bosnia, 106, 347
Bosporus, 119, 108
Boston, 41, 208, 343, 350
Botany Bay, 292
Bothnia, G., 96
Boulder Clay, 63
Boulders, 63
Boulogne, 73
Bourke, 302, 346
Bournemouth, 47
Boyne, R., 55
Bradford, 26
Bradford (Wiltshire), 38
Brahmaputra, 174
Brahmins, 174
Brazil, 234-236, 231, 350
Brazil current, 319
Brazilian highlands, 235, 232
Bread-fruit, 309
Brecon Beacons, 33
Breezes, land and sea, 324
Bremen, 87
Bremerhaven, 87
Brenner Pass, 78, 102, 115
Breslau, 87, 339
Brest, 74, 339
Bretons, 74
Bridgwater, 49
Brighton, 46
Brindisi, 118
Brisbane, 303, 349
Bristol, 37, 347
Bristol Channel, 30, 36, 37
British Columbia, 203-204
British East Africa, 271, 349
British Isles, 9-69, 347, 338
British Isles: Geological structure, 62; relief, 64; river system, 64; climate, 64-65; vegetation, 64-65; forests, 65; live stock, 65; fish, 65; minerals and metals, 66; population, 66-67; languages, 67; commerce, 68-69
Brittany, 74
Broads, 42
Broken Hill, 298
Bromsgrove, 38
Bromwich, West, 38
Brooklyn, 209
Bruges, 91
Brunei, 181
Brünn, 102
Brussa, 140
Brussels, 91, 339, 347
Buchan Peninsula, 14
Buckinghamshire, 43
Budapest, 105, 339, 347
Buddhism, 155
Buenos Aires, 238, 344, 350
Buffalo, 214, 343
Bukarest, 107, 339, 347
Bulawayo, 279
Bulgaria, 107, 347
Bunbury, 296
Burgundy Canal, 78
Burgundy, gate of, 77
Burma, 180-181, 168, 179
Burnley, 30
Burra Burra, 298
Burton - upon - Trent, 39
Bury, 29
Bushmen, 279, 290
Bushire, 151, 341
Bute, 17
Butte, 217
Buxton, 24

Cabot, 190
Cacao, 221, 328
Cader Idris, 33
Cadiz, 112
Cagliari, 119
Cairns, 302
Cairo, 258, 345, 349
Caithness, 14
Calais, 73, 78
Calcutta, 174, 341, 348
Calder, R., 22, 25
Caledon, R., 280, 281
Caledonian Canal, 10
Caledonian Railway, 18, 21
Calgarry, 203
California, 219, 220
Californian current, 320
Callao, 240
Calm belts, 324
Cam, R., 41
Cambodia, 180
Cambodia, L., 180
Cambrai, 73
Cambridge, 41, 338
Camel, 149
Campbeltown, 13
Camphor, 164, 168
Canada, 193-194, 19 205, 343, 350
Canadian Northe Railway, 205
Canadian Pacific Rai way, 200, 203, 20 205
Campos, 235
Campsie Fells, 15
Canal du Centre, 78
Canaries, 248
Canaries current, 320
Candia, 108
Cane-sugar, 328
Cantabrian Mts., 109 112, 121
Canterbury, 47
Canterbury Plains, 31
Canton, 164, 341, 348
Canton, R., 164
Cape Breton Island 202
Cape of Good Hope Province of the 283, 349
Cape to Cairo Rail way, 284
Cape Town, 284, 277 345, 349
Cape Verde Islands 248
Cape York Peninsula 302
Caracas, 232, 344 350
Caravans, 149, 250
Cardiff, 32, 33, 69, 34
Cardigan Bay, 33
Caribbean Sea, 223
Carlingford L., 58
Carlisle, 21
Carmarthen, 33
Carmel, Mt., 141
Carnarvon, 32, 31
Carntual, 59
Caroline Isles, 309
Carpathian Mts., 105 121
Carpentaria, Gulf of 297, 298
Carrara, 116
Carse of Gowrie, 16
Carstairs, 18
Cartagena, 112
Carter Bar Pass, 21
Cascade Mts., 204, 21
Caspian Sea, 100, 101
Castleconnel, 55
Castleton, 24
Cattle, 332
Caucasian race, 124 187, 246, 289, 30 309, 336
Caucasus Mts., 96, 10 121
Cauvery, R., 176
Cawnpur, 174
Cayenne, 234
Celebes, 181
Celtic languages, 6 124
Celtic races, 67
Cenis, Mont, Tunne 77, 78, 113
Central Plain of Ir land, 53-56
Central Plain of Sco land, 17

Central Plateau of France, 74, 121
Cereals, 326-327
Cetigne, 121, 347
Ceuta, 246
Cevennes, 74
Ceylon, 178, 348
Chad, L., 260, 286
Chaldæa, 144
Chalk, characteristics of, 62
Champagne, 74
Champlain, L., 208
Channel Isles, 51
Charleston, 212
Charters Towers, 302
Chatham, 46, 47
Chaudière Falls, 198
Cheddar, 49
Chelmsford, 42
Cheltenham, 37
Chemnitz, 86
Chenab, R., 172
Chengtu, 163, 348
Chepstow, 36
Cherbourg, 74
Cherra Punji, 341
Cherwell, R., 43
Chesapeake Bay, 211
Cheshire, 30
Cheshire Plain, 36
Chesil Beach, 48
Chester, 36
Cheviot Hills, 21
Chicago, 215, 343, 350
Chile, 240, 242, 232, 350
Chiltern Hills, 40, 43
Chimborazo, Mt., 239
China, 157-165, 348
Chinde, 278
Chinook winds, 203
Christchurch, 312, 346, 349
Christiania, 94, 339, 347
Chungking, 163, 348
Churchill, R., 196
Cilician Gates, 141
Cinchona, 178, 239, 240
Cincinnati, 216, 211
Cinnamon, 164
Clay, characteristics of, 62
Cleveland, 215, 24, 26, 211
Clew Bay, 56
Clifton, 37, 338
Climate, continental, 5
Climate, insular, 5
Climate of W. Europe, 322-325, 2-7
Climatic regions, 122, 184, 227, 242, 286, 305
Cloves, 182, 271
Clyde and Forth Canal, 17
Clyde, Firth of, 17
Clyde, R., 17, 18, 64
Coal, 108, 333
Coal-fields, British, 66
Coast Range, 219, 225
Coatbridge, 17
Coblenz, 84
Cochin China, 180
Cochineal insects, 221
Cocoa, see Cacao
Coco-nuts, 178
Cod, Cape, 206
Coffee, 147, 328
Cognac, 75
Coir, 330
Colchester, 42
Colne, R., 42
Cologne, 82
Colombia, 239, 232, 350
Colombo, 178, 341, 348
Colon, 222, 344
Colorado, 217, 218
Colorado, R., 218
Columbia, R., 217, 219
Columbus, 189
Como, 115
Como, L., 114
Comoro Isles, 275
Confucius, 161
Congo, R., 268-269, 285
Coniston, L., 27
Conn, L., 56
Connaught, 56, 52
Connemara, 56
Constantine, 247
Constantinople, 119, 339, 347
Continental Shelf, 318
Conway, R., 32
Cook, 292
Cook, Mt., 311
Cook Strait, 292, 310
Coolgardie, 296
Cooper's Creek, 298
Copal, 270
Copenhagen, 91, 339, 347
Copiapo, 344
Copper, 333
Copra, 178, 330
Corinth Canal, 121
Corinth, Gulf of, 121
Corisco, 266
Cork, 59, 113, 246
Cork Harbour, 59
Cornwall, 50
Corrib, L., 56
Corrib, R., 56
Corsica, 108
Costa Rica, 221, 222
Côte d'Or Range, 70, 71, 75, 76
Cotentin, 74
Cotopaxi, Mt., 239
Cotswold Hills, 37, 34, 36, 40, 43
Cotton, 330
Cotton industry (Lancashire), 29
Cotton industry (U.S.A.), 208
Cotton-plant, 163
Cotton, Sea Island, 212
Coventry, 38
Cracow, 105, 339
Crete, 108
Creuzot, 75
Crewe, 36
Crimea, 101
Crinan Canal, 13
Cromarty, 14
Cross Fell, 22
Crow's Nest Pass, 203
Croydon, 44
Cuba, 224, 220, 223
Cumberland, 21, 28
Cumberland, R., 211
Cumbrian Mts., 27, 22
Cupar, 18
Currents, 319-320
Currents, ocean, 319-320
Cutch, Rann of, 172
Cuxhaven, 87
Cyclones, 6, 303, 309
Cyprus, 108

Dahomey, 266
Damara - Nama Plateau, 278
Damascus, 144, 142, 348
Damietta, 255, 257
Dannemora, 96
Danube, R., 84, 102-107
Danzig, 88
Dar-es-Salam, 271
Dardanelles, 108
Dariel Pass, 96, 101
Darjiling, 170, 341
Darling Downs, 300, 303
Darling, R., 299
Darlington, 24, 25
Dart, R., 50
Dartmoor, 49
Davos, 339
Dawson City, 204
Day and night, 4, 313
De Aar, 283
Dead Sea, 144, 143
Dean, Forest of, 65
Debreczin, 339
Deccan, 174
Dee, R. (Scotland), 11, 14
Dee, R. (Wales and England), 33, 31, 36
Deer-forests, 12
Delaware, R., 210
Delft, 90
Delhi, 174
Demavend, Mt., 153
Demerara, 234
Denmark, 91-92, 347
Denver, 217, 343
Derby, 39
Derbyshire, 24, 39
Derg, L., 55
Derry, 57
Derwent, 39
Derwent, R., 39
Derwent, R. (Yorkshire), 26
Derwentwater, L., 27
Deserts, Arabian, 148-149
Deserts, Australian, 294-296
Deserts, distribution of, 326
Detroit, 200, 215
Devizes, 48
Devon, 50
Devonport, 50
Diamantina, R., 298
Diamonds, 283
Diary, 277
Diatom ooze, 138
Dieppe, 73, 78
Dijon, 76
Dinaric Alps, 106
Dingle Bay, 59
Dingwall, 14
Dividing Range, 302
Dnieper, R., 101
Dniester, R., 101
Dogger Bank, 2, 65
Doldrums, 324
Dollart Zee, 88
Don, R. (English), 25, 26
Don, R. (Russian), 101
Don, R. (Scotch), 11, 14
Doncaster, 26
Donegal, 57
Donegal Bay, 52, 57
Donetz, R., 101
Dorchester, 47
Dordogne, R., 75
Dorset, 47, 48
Dortmund-Ems Canal, 87
Doubs, R., 75
Douglas, 30
Douro, R., 109, 113
Dove, R., 39
Dover, 46, 69, 338
Dovre Field, 93
Down, 58
Downs, North, 45-46
Downs, South, 45-46
Downs, Western, 45
Drakenberg Mts., 281, 282
Drave, R., 104
Dravidians, 188
Dresden, 86
Drogheda, 55
Droitwich, 37
Drumochter Pass, 12
Dublin, 54, 338, 347
Dublin Bay, 54
Dukeries, the, 39
Duluth, 215
Dumbarton, 15
Dumfermline, 18
Dumfries, 20
Duncansby Head, 14
Dundalk, 55
Dundee, 16
Dundee, Natal, 282
Dunedin, 312, 346
Dungeness, 46
Dunkirk, 73, 78
Durance, R., 76
Durban, 282, 349
Düsseldorf, 85
Dvina, Northern, R., 98
Dvina, Western, R., 99
Dzungaria, 156
Dzungarian Gap, 133, 156, 160

Earth: shape, 313; size, 313; movements, 313
Earthquakes, 166, 315
East Anglian Heights, 40
East Anglian Plain, 42, 40
East Indies, 181-182, 348
East London, 284
Ebro, R., 112, 109

Ecuador, 239, 350
Eddystone Lighthouse, 50
Eden, R., 21, 22, 28
Edge Hill, 34, 40
Edinburgh, 18, 338, 347
Edmonton, 202, 343
Edward, L., 252, 271
Egmont, 310
Egypt, 254-257, 349
Eifel Mts., 84
Ekaterinburg, 101
Elba, 119
Elbe, R., 86
Elberfeld-Barmen, 85
Elburz Mts., 153, 150
Elche, 112
Elephant, African, 288
Elephant, Asiatic, 179
Elgin, 14
Elgon, Mt., 272
Ely, 41
Emden, 87
England, 347
England and Wales, 21-69
English Channel, 1, 70
Epping Forest, 65
Equator, 313
Equinoxes, 313
Er Rif, 245
Erie Canal, 199, 208
Erie, L., 214, 2135
Eritrea, 258
Erne, R., 56
Erz Gebirge, 81, 86
Erzerum, 141
Escarpment, 40, 45
Esdraelon, plain of, 141, 143
Eskimos, 192, 198
Esparto grass, 112, 245, 252
Essen, 85
Essex, 42
Etangs, 76
Etesian winds, 256
Ethiopian Province, 187, 288, 331
Etna, 118
Eton, 43
Ettrick, R., 20
Eucalyptus, 303
Eucla, 346
Euphrates, R., 140, 146
Europe, 1-127, 339-340, 347, 350
Europe: relief, 121; river system, 122; climate, 122-123; vegetation, 122-123; population, 123; races, 124; languages, 124; commerce, 124-127; tariffs, 126; railways, 126-127; time, 127
Everest, Mt., 169
Exe, R., 50
Exeter, 50
Exmoor, 49
Eyre, L., 298

Fair Head, 57
Falkirk, 17
Falkland Isles, 238
Fall River, 208
Falmouth, 338
False Bay, 283, 284
Faroe Isles, 92
Fashoda, 260
Faults, 166
Fauna, 330-333; insular, 332
Fayum, 254, 255
Fellahin, 289
Fens, 41
Fergana, 137
Fernando Po, 266
Ferrel's Law, 324
Fez, 246, 252, 349
Fichtel Gebirge, 81
Fife, 18
Fife Ness, 18
Fiji Islands, 309
Finland, 98
Finster-aar-horn, Mt., 79
Fiords of Norway, 94
Fish, 333, 65, 108, 196, 202, 204, 214
Fishguard, 34
Fiume, 106
Flamborough Head, 27
Flax, 57, 330
Fleetwood, 29
Flinders Range, 298
Flint, 33
Florence, 116, 339
Florida, 212
Flushing, 90
Folkestone, 46
Foreland, North, 46
Foreland, South, 46
Forests, British, 65
Forests, distribution of, 325, 326
Forests, European, 123
Forests, North American, 227, 198, 202
Forests, Siberian, 131
Forests, tropical, 234, 269, 287
Forfar, 16
Formosa, 168, 165
Fort Chippewyan, 343
Fort Churchill, 196
Fort William, 338
Forth Bridge, 16, 18
Forth, R., 11, 15
Fossils, 60
Foveaux Strait, 310
Foyle, L., 57
Foyle, R., 57
France, 70-78, 347
Frankfurt, 83
Franklin Strait, 192
Fraser, R., 204
Fray Bentos, 238
Fredericton, 202
Freemantle, 296
Freetown, 265
French Equatorial Africa, 266, 349
Fula tribes, 262, 290
Fundy, Bay of, 202
Furness, 28
Futa Jallon, 261, 264

Gainsborough, 39
Gairdner, L., 298
Gala, R., 20
Galashiels, 20
Galicia, 105
Galilee, Sea of, 144
Galveston, 216
Galway, 56
Galway Bay, 52
Gambia, 264
Gambia, R., 264, 285
Ganges, R., 173-174
Garda, L., 114
Garonne, R., 75
Garry, R., 12
Gateshead, 24
Gellivara, 96
Gemmi Pass, 78
Geneva, 81
Geneva, L., 81
Genoa, 115, 339
Georgetown, 234, 344
Georgian Bay, 199
Geraldton, 346
German East Africa, 271, 349
German Empire, 347
German South-West Africa, 278, 349
Germany, 81-88
Geysers, 217, 310
Ghats, Eastern and Western, 175
Ghent, 91
Giant's Causeway, 57, 13
Gibraltar, 112, 339
Gibraltar, Straits of, 112
Ginseng, 157, 165
Gippsland, 304
Gironde, 75
Glaciated valleys, 79
Glaciers, 79
Glamorgan, 33, 34
Glasgow, 17-18, 69, 338
Glastonbury, 49
Glenmore, 10
Globigerina ooze, 318
Glommen, R., 95
Gloucester, 37
Gloucestershire, 37
Goa, 176
Goats, 332
Gobi, desert of, 156
Godaveri, R., 176
Gold, 334
Gold Coast, 266, 265
Gold Range, 204
Golden Horn, 120
Golden Vale, 54
Gondar, 345
Good Hope, Cape of, 277, 283
Goole, 26
Göta Canal, 96
Göteborg, 96
Gothenburg, 96
Gothland, 96
Gower Peninsula, 34
Graaff Reinet, 284, 345
Grain Coast, 265
Grampians, the, 10
Gran Chaco, 236
Granada, 112
Grand Canal, 54
Grand Trunk Pacific Railway, 205
Grand Trunk Railway, 200, 208
Granite, characteristics of, 62
Grasmere, L., 27
Grasslands, distribution of, 325
Graz, 104
Great Australian Bight, 294
Great Banks, 196
Great Basin, 218
Great Bear L., 202
Great Northern Railway, U.S.A., 219, 220
Great Orme's Head, 32
Great Plain of China, 160
Great Plains, U.S.A., 216-217
Great St. Bernard Hostel, 339
Great St. Bernard Pass, 78
Great Slave L., 202
Great Wall of China, 157
Greece, 121, 347
Greenland, 192-193, 189
Greenock, 18
Greenore, 58
Greenwich, 44
Grimsby, Great, 41
Griqualand East, 282
Griqualand West, 283
Ground-nuts, 264
Guadalquivir, R., 109, 112
Guadeloupe, 224
Guadiana, R., 109
Guano, 240
Guardafui, Cape, 258
Guatemala, 222
Guayaquil, 239
Guayaquil, Gulf of, 239
Guernsey, 51
Guiana, British, 232, 234
Guiana highlands, 231, 232
Guiana States, 232, 234, 231
Guildford, 46
Guinea, French, 266
Guinea, Gulf of, 266
Guinea, Upper and Lower, 264-268
Gulf Stream, 194, 319
Gutta-percha, 182, 330
Gympie, 302

Haarlem, 90
Hague, The, 90
Haidarabad, 177
Hainan, 164
Haiti, 223
Hakodate, 166
Hala Mts., 169, 153
Halifax (Canada), 202, 343
Halifax (Yorkshire), 26, 22
Hamburg, 86, 340

Hamilton, 200
Hamitic races, 289, 290
Hampshire, 47
Hampshire Basin, 45, 47
Han, R., 162, 163
Hangchow, 161, 160
Hankow, 163
Hanley, 38
Hanoi, 180, 348
Hardanger Field, 93
Harmattan wind, 265
Harrar, 259, 349
Harris, 13
Harrismith, 281
Harrogate, 25
Hartlepool, 24
Harwich, 42
Harz Mts., 86, 82
Hastings, 46
Hatteras, Cape, 212
Hauran, 144
Hausa tribes, 262, 290
Havana, 224, 344
Havel, R., 86
Havre, 72, 78
Hawaiian Isles, 309, 220
Hawick, 20
Hawke Bay, 310
Hebrides, Outer and Inner, 13
Height of land, 225
Hekla, Mt., 92
Helsingfors, 99
Helvellyn, 27
Henequen, 221
Herat, 153
Herberton, 302
Herculaneum, 118
Hereford, 36
Hereford, county of, 37
Hermon, Mt., 141, 144
Herzegovina, 106
Heysham, 29
Highland Railway, 12
Highlands of Scotland, 10-15
Himalaya Mts., 169-170
Hindu Kush Mts., 168, 136
Hobart, 305, 346, 349
Hokitika, 346
Hokkaido, 166, 165
Holderness, 27
Holland, 88-90, 347
Holyhead, 32
Holy Isle, 21
Hondo, 166-167, 165
Honduras, 222
Honduras, British, 222
Hong-Kong, 164
Honolulu, 309
Hook of Holland, 90
Hops, 65
Horn, Cape, 242
Horse latitudes, 324
Hottentots, 279, 290
Hovas, 275, 290
Howth Head, 54
Hoy, 14
Huddersfield, 22, 26
Hudson Bay, 192
Hudson Bay Company, 198
Hudson, R., 208, 210
Hué, 180, 341
Huelva, 110
Hugli, R., 174
Hull, 27, 69
Humber, 27
Hungary, 105, 347
Huntingdon, 41
Hurricanes, 223
Hwang-ho, R., 158

Iberian Mts., 109
Iberian Peninsula, 109-113
Ice action, 63
Iceland, 92, 340, 347
Ichang, 161, 341
Idria, 104
Ilfracombe, 49
Ili, R., 137
Ill, R., 83
Illinois, 214
Imperial Canal, 160
India, 168-177, 348
Indian Ocean, 318, 319
Indian reservations, 216
Indian territory, 217
Indo-China, 178-181
Indus, R., 172
Ingleborough, 22
Inland Sea, 165, 168
Inn, R., 102
Innsbruck, 102
Insular fauna, 322
Inverary, 13
Inverness, 14
Iona, 13
Ipswich, 42
Ipswich (Queensland), 302
Iquique, 240
Iran, plateau of, 150-154
Irawadi, R., 179, 178, 180
Ireland, 52-59, 347
Irish Sea, 1, 30
Irkutsk, 132, 341, 348
Iron, 333
Iron-fields, British, 66
Iron gates, 107
Irrigation in Egypt, 255
Irthing, R., 22
Irtish, R., 133
Irwell, R., 22, 29
Isar, R., 84
Islay, 13
Ismailia, 257
Isobars, 6
Isotherms, 5
Ispahan, 152
Italy, 113-119, 347
Ivory, 288, 130, 265, 269
Ivory Coast, 265, 266

Jade, 156
Jaffa, 143
Jamaica, 224, 221, 223
James, R., 212
Japan, 165-168, 348
Japan Sea, 165
Jarrah, 296
Jarrow, 24
Java, 182, 181, 348
Jedburgh, 20
Jedda, 147
Jehlam, R., 170
Jericho, 144
Jersey, 51
Jerusalem, 143
Johannesburg, 280, 349
Jordan, R., 143-144
Judæa, 143
Jumna, R., 173, 174
Jungfrau Mt., 79
Jura, 13
Jura Mts., 70, 81, 121
Jute, 173
Jutland, 91

Kabul, 153, 348
Kabul, R., 153
Kafirs, 281, 290
Kaiser Wilhelm Ship Canal, 87
Kalahari Desert, 279
Kalgoorlie, 296
Kama, R., 100
Kamchatka, 165
Kameruns, 266, 349
Kandahar, 154
Kangaroos, 306
Kano, 262, 252
Kansas, 216
Kansas, R., 214, 216
Kaolin, 50
Karachi, 173, 341
Karakorum Mts., 169
Karakorum Pass, 169
Karlsbad, 102
Karri timber, 296
Karroos, Little and Great, 284, 283
Kashgar, 156, 341, 348
Kashmir, 168, 170
Kassai, R., 268
Katanga, 268
Katrine, L., 12
Kattegat, 92
Kauri gum, 310
Kazan, 100
Kendal, 27
Kenilworth, 38
Kenmare, R., 59
Kennet, R., 43
Kent, 46, 47
Kentucky, 211, 214, 216
Kenya, Mt., 272
Kerman, 152
Kerry, 59
Keswick, 27
Kew, 44
Key West, 212
Khaibar Pass, 168, 153
Khamsin wind, 256
Kharbin, 157
Kharkov, 101
Khartum, 260, 345
Kherson, 101
Khingan Mts., 150
Khiva, 138
Khorassan Mts., 153, 136
Kiakhta, 133
Kicking Horse Pass, 203
Kidderminster, 38
Kiel, 87
Kiev, 101
Kilimanjaro, Mt., 272
Kilkenny, 54
Killarney, L., 59
Killiecrankie Pass, 12
Kilmarnock, 18
Kimberley (Australia), 296
Kimberley (S. Africa), 283
Kincardine, 15
King George's Sound, 296
Kingston, 196
Kingston (Jamaica), 224, 344
Kingstown, 54, 32
Kinsale, 58
Kintyre Peninsula, 13
Kiolen Mts., 93
Kirghiz, 136
Kirkcaldy, 18
Kirkwall, 14
Kistna, R., 176
Kiushiu, 167, 165
Klondike, 204, 205
Knockmealdown Mts., 58
Kobe, 167
Kola nuts, 261, 262
Königsberg, 88
Kopjes, 279, 280, 284
Korea, 165, 348
Kosciusko Mts., 303
Kra, Isthmus of, 181
Kraal, 282
Krasnoyarsk, 132
Krefeld, 85
Krivoi Rog, 101
Kronstadt, 100
Krumen, 266
Kubango, R., 277
Kuenlun Mts., 150, 156
Kufra, 250, 252
Kuka, 262, 252
Kumassi, 266
Kur, R., 140
Kurds, 141, 188
Kuria Muria Isles, 148
Kurile Isles, 166, 165
Kuro Siwo, 167, 319
Kyoto, 168

La Guayra, 232
La Paz, 240, 350
Labrador, 196
Labrador current, 194
Labuan, 182, 181
Lachlan, R., 299
Lacquer, 167
Lado, 252, 259, 345
Ladoga, L., 98
Ladysmith, 281, 282
Lagan, R., 57
Lagos, 264, 345
Lahn, R., 84
Lahore, 172, 341
Laing's Nek, 282
Lake District, English, 27
Lake Peninsula, the, 200
Lanark, 17
Lancashire, 27-30
Lancaster, 29
Land, relief and structure, 315-316
Landes, 75
Land's End, 50

Lange Bergen, 283
Langres, Plateau of, 70, 71
Lapland, 93-94
Larne, 58
Latitude, 314
Latitude, parallels of, 313
Launceston, 50, 305
Laurentian Plateau, 196
Lausanne, 81
Lea, R., 43
Lead, 333
Leadville, 217
Leamington, 38
Lebanon Mts., 141
Lee, R., 58, 59
Leeds, 26, 347
Leeds and Liverpool Canal, 22
Leghorn, 116
Leh, 341
Leiçester, 39
Leicestershire, 39
Leinster, 52
Leipzig, 86
Leith, 18
Lemberg, 105
Lemurs, 275, 289
Lena, R., 132
Leopoldville, 268
Lerwick, 14
Lewes, 47
Lewis, 13
Lhasa, 155, 348
Liberia, 266
Libreville, 268, 349
Libyan Desert, 249
Liège, 91
Liffey, R., 54
Lille, 73
Lima, 240, 344, 350
Limerick, 56
Limestone, characteristics of, 62
Limoges, 75
Limpopo, R., 278, 285
Linares, 110
Lincoln, 40
Lincoln Edge, 34, 40
Linen industry, 57
Linnhe, L., 10
Linseed, 330
Lisbon, 113, 340, 347
Liverpool, 30, 33, 69, 338, 347
Liverpool Plains, 300
Liverpool Range, 300
Lizard, 50
Llama, 238, 240, 333
Llanberis, 32
Llanberis Pass, 32
Llandaff, 32, 33
Llandudno, 32
Llanelly, 33, 34
Llanos, 232
Loanda, 268, 345, 349
Lob Nor, L., 155
Lobito Bay, 268
Lodz, 100
Loess soil, 158
Loetschberg Tunnel, 78
Lofoten Isles, 94
Logan, Mt., 204
Loire, R., 74
Lombardy, Plain of, 113
Lomond, L., 12
London, 43-44, 69, 338, 347
Londonderry, 57
Long Island, 209
Longitude, 315
Longitude, meridians of, 127, 315
Lorient, 74
Lorraine, 84
Lot, R., 75
Louisville, 216
Lourenço Marques, 278, 280, 345, 349
Lowell, 208
Lowestoft, 42
Lowlands of Scotland, 15-18
Lowther Hills, 18
Lualaba, R., 268
Luapula, R., 268
Lübeck, 88
Lucca, 116
Lucerne, 81
Lucerne, L., 81
Luchu Isles, 165
Lucknow, 174
Ludlow, 36
Lumber industry, 198
Lune, R., 22, 29
Luxemburg, 347
Luxemburg, Grand Duchy of, 88
Luzon, 181
Lyons, 76, 340
Lys, R., 91

Maas, R., 89
Macao, 164
Macclesfield, 36
Mace, 182
Macgillycuddy's Reeks, 59
Mackay, 346
Mackenzie, R., 196, 202
Macquarie, R., 300
Madagascar, 275, 349
Madeira Isles, 248
Madeira, R., 234
Madras, 177, 168, 341, 348
Madrid, 110, 340, 347
Magdalena, R., 239
Magdeburg, 86
Magellan Straits, 190, 238, 242, 344
Maggiore, L., 114
Magyars, 105
Mahanadi, R., 176
Maidstone, 47
Main, R., 83
Maine, 206, 208
Mainz, 83
Maize, 328
Malabar coast, 177
Malacca, 181
Malacca, Straits of, 181
Malaga, 112
Mälar, L., 96
Malay Peninsula, 181
Malmö, 96
Malta, 108
Malvern, 37
Malvern Hills, 36, 37
Man, Isle of, 30
Manaar, Gulf of, 178
Managua, 222
Manaos, 235, 344
Manchester, 27 - 29, 338-347
Manchester Ship Canal, 29
Manchuria, 157, 348
Manchus, 188
Mandalay, 180, 341
Mangoes, 270
Mangroves, 265, 270, 298
Manhattan Island, 209
Manila, 182, 341, 348
Manila hemp, 182
Manitoba, 203
Mannheim, 83
Maoris, 312, 349
Marble, 54, 56, 60
March, R., 105
Marches, the, 34, 36
Maree, L., 10
Margate, 46
Marine deposits, 318
Maritza, R., 107, 119
Maritzburg, 282, 345, 349
Marlborough Downs, 40, 43, 45
Marmora, Sea of, 108
Marne, R., 71
Marseilles, 76, 78, 340
Marsupials, 306
Martinique, 223, 224
Masai tribe, 273
Masailand, 272
Mashona tribe, 279
Mashonaland, 279
Mask, L., 56
Maskat, 342
Massaau, 345
Massachusetts, 208
Matabili tribe, 279
Matabililand, 279
Maté, 236
Matlock, 24, 39
Matterhorn, 79
Matto Grosso, 235
Mauritius Isle, 275
Mayence, 83
Meath, 52
Mecca, 147, 348
Medina, 147
Mediterranean Sea, 108-109, 319, 320
Medway, R., 43, 47
Meissen, 86
Mejerda, R., 245, 247
Mekong, R., 179, 162, 180
Melanesian Isles, 308
Melanesian race, 308
Melbourne, 304, 294, 346, 389
Melrose, 20
Menai Straits, 32
Menam, R., 178, 180
Mendips, 49
Mendoza, 344
Mequinez, 246
Mercury, 334
Mersey, R., 22, 29, 30
Merthyr Tydvil, 33
Merv, 138
Meshed, 153
Mesopotamia, 144-146, 348
Messina, Straits of, 118
Metals, 333-334
Metz, 84
Meuse, R., 89, 91
Mexico, 220-222, 344 350
Michigan, L., 215
Middelburg, 280
Middlesbrough, 24, 25 26
Midland Plain, English, 34-39
Milan, 115, 340
Mildura, 299
Milford Haven, 34
Minch, 13
Mindanao, 181
Minerals, 333-334
Minneapolis, 215
Mirage, 149
Mississippi Bottoms 214
Mississippi, R., 212 216
Missouri, R., 212, 216
Mobile, 216
Mogador, 246, 252
Mohair, 332
Mohammed, 147
Mohawk, R., 208, 210
Moldau, R., 102
Mole, R., 43
Moluccas, the, 181 182
Mombasa, 271, 349
Mongolia, 156, 348
Mongolian languages 124
Mongolian race, 124 188, 337
Mongolo-Tartar races 188
Monmouth, 36
Monmouth, county of 33, 37
Monsoons, 156, 171 176
Mont - aux - Sources 281, 282
Montenegro, 121, 347
Montevideo, 238, 34 350
Montreal, 200, 343 350
Montrose, 16
Montserrat, 224
Moonta, 298
Moors, 112, 246
Moraines, 79
Morava, R., 107
Moravia, 102
Moravian gate, 105
Moray Firth, 10
Morecambe Bay, 28, 2
Morocco, 246, 349
Moscow, 100, 340
Moselle, R., 84
Mosquitoes, 289
Mostar, 106
Mosul, 146
Mount Margaret, 296
Mount Morgan, 302
Mount's Bay, 50
Mourne Mountains, 5
Moville, 57
Mozambique, 271
Mozambique Channe 275
Mozambique current 277, 319

Mukden, 157, 348
Mülhausen, 82
Mull, 13
Mullingar, 54
Munich, 340, 84
Munster, 52
Mur, R., 104
Murchison, 296
Murchison Falls, 273
Murcia, 112
Murray, R., 299
Murrumbidgee, R., 299
Murzuk, 250, 252
Mutton, 332
Mweru, L., 268, 271, 274
Mysore, 168, 177

Nagasaki, 168
Nairn, 14
Namur, 91
Nancy, 74
Nantes, 74
Naples, 118, 340
Narbada, R., 176
Natal, 282, 277, 349
National Park, 217
Neagh, L., 57
Nearctic Province, 228, 331
Neckar, R., 83, 84
Needles, 48
Negrito races, 188
Negro races, 290, 337
Negro, R., 234
Negroes, American, 230
Nejd, 149
Nelson, R., 196
Neotropical province, 243, 331
Nepal, 168
Ness, L., 10
Ness, R., 10, 14, 40, 41
Neva, R., 98
New Brunswick, 202
New Caledonia, 308
New England Plateau, 303
New England States, 206
New Forest, 47
New Guatemala, 222
New Guinea, 308
New Hebrides Isles, 308
New Orleans, 216, 343
New South Wales, 303-304, 308, 349
New Westminster, 204, 343
New York, 209, 350
New Zealand, 310-312, 349
Newark, 39
Newcastle, 25
Newcastle (England), 24
Newcastle (Natal), 282
Newcastle (New South Wales), 303
Newfoundland, 194-196
Newhaven, 46
Newport (I. of Wight), 48
Newport (Monmouth), 33
Newry, 58
Newry Canal, 58
Newry, R., 58
Newtown, 33
Ngami, L., 277, 286
Niagara, Falls of, 199
Nicaragua, 222
Nice, 76
Nieuwveld Mts., 281, 283
Niger, R., 261, 262, 264, 285
Nigeria, 262-264, 349
Niigata, 167, 342
Nijni-Novgorod, 100
Nile, R., 252-256, 259-260, 273
Nile, Blue, R., 258, 254, 260
Nile, White, R., 252, 260
Nilgiri Hills, 175, 177
Nîmes, 76
Nineveh, 146
Nith, R., 20
Niuchwang, 157
Nore, R., 54, 58
Norfolk, 42
Normandy, 72
Normanton, 302
North Atlantic Drift, 2, 319
North Channel, 1
North Island (N.Z.), 310
North Sea, 1
North-West Passage, 190
North Yorkshire Moors, 26, 40
Northampton, 41
Northern Pacific Railway, 220
Northern Territory, Australia, 297
Northumberland, 24, 25
Northwich, 36
Norway, 94-95, 347
Norwich, 42
Nottingham, 39
Nottinghamshire, 39
Nova Scotia, 202
Novaya Zemlia, 184
Nubia, 254
Nubians, 290
Nullabor Plains, 294
Nuremberg, 84
Nutmeg, 182
Nyasa, L., 275, 271
Nyasaland, 274, 349

Oats, 328
Ob, R., 133, 132
Oban, 13
Obok, 258
Ocean, 316-320
Ocean: size, 316; depth, 316; floor, 316-318; salinity, 318; currents, 319; temperature, 320
Oceania, 346
Ochill Hills, 15
Oder, R., 87, 88
Odessa, 101, 340
Ohio, R., 211, 214, 216
Oil shale, 66, 17
Oise, R., 71
Oka, R., 100
Okhotsk Sea, 165
Oldham, 29, 30
Omaha, 216, 343
Oman, 148
Omdurman, 260, 349
Omsk, 133
Onega, L., 98
Ontario, 200
Ontario, L., 199, 200, 214
Ookiep, 283
Oozes, 318
Opium, 162
Oporto, 113
Opossums, 306
Oran, 247
Orange Free State, province of, 280, 349
Orange, R., 281, 283, 285
Orenburg, 138
Orient Express Line, 127, 104, 107, 119, 120
Oriental Province, 186, 331
Orinoco, R., 232
Orizaba, Mt., 221
Orkney Isles, 14
Orleans, 74
Ormuz, 152
Orontes, R., 141
Ostend, 91
Otago, 312
Otira gorge, 311
Ottawa, 198, 350
Ottawa, R., 196, 198, 200
Oudtshoorn, 284
Ouse, Great, R., 40, 41, 64
Ouse (Sussex), 47
Ouse (Yorkshire), R., 22, 25, 26, 64
Oxford, 43, 338
Oyster fisheries, 66, 74, 333
Ozaka, 167, 348

Pacific Ocean, 318
Pacific Ocean Islands, 308-312
Paisley, 18
Palæarctic Province, 186, 288, 331
Palermo, 119, 340
Palestine, 141, 143
Palghat Gap, 175
Palk Strait, 178
Palm-oil, 264, 265, 270
Palmerstown, 298
Pamirs, 150, 136
Pampas, the, 236
Panama, 222
Panama Canal, 222-223
Papua, 308
Papuans, 308
Para, 235, 344
Paraguay, 236 - 238, 232, 350
Paraguay, R., 232, 234, 236
Paramaribo, 234
Paramatta, 303
Parana, R., 232, 235, 236
Paris, 71-72, 78, 340, 347
Pasco, 240
Patagonia, 238, 344
Patna, 173
Patras, 121
Paysandu, 238
Peak District, 24, 22
Pearls, 333
Peat, 11
Pei-ho, R., 160
Peking, 161, 342, 348
Pemba, 271
Pembroke, 31, 34
Pembroke Dock, 34
Penang, 181
Pennine Alps, 79
Pennine Chain, 22, 25, 29
Pennsylvania, 210, 211
Pentland Firth, 14
Pentland Hills, 18
Penzance, 50
Pepper, 182
Perim, 148, 258
Perm, 100, 340
Pernambuco, 236
Persia, 150-154, 348
Persian Gulf, 152
Perth (Australia), 296, 346, 349
Perth (Scotland), 16, 15
Peru, 239-240, 232, 350
Peru current, 240, 320
Peshawar, 168, 342
Peterborough, 40
Peterhead, 15
Peterill, R., 29
Petroleum, 333
Philadelphia, 210, 350
Philippines, 182, 181, 220, 348
Phormium, 310
Pietermaritzburg, 282
Pilchards, 54
Pilcomayo, R., 238
Pilgrim Fathers, 230
Pilsen, 102
Pindus Mts., 119, 121
Pisa, 116
Pittsburg, 211
Platinum, 334
Platte, R., 214
Plinlimmon, 33
Plumbago, 27, 178
Plymouth, 50
Plymouth Sound, 50
Po, R., 113
Poland, 100
Polynesian Isles, 309
Polynesian race, 309
Pompeii, 118
Pondoland, 282
Pontic Mts., 140, 150
Poona, 177, 342
Population, distribution of, 334-336
Port Adelaide, 299
Port Alfred, 284
Port Arthur, 157
Port Augusta, 299
Port Darwin, 298, 346

Port Elizabeth, 283, 345
Port Florence, 273
Port Jackson, 304, 292
Port Melbourne, 304
Port Natal, 282
Port Nolloth, 283
Port Phillip, 304
Port Pirie, 298, 299
Port Said, 257
Port Sudan 256
Portland Bill, 48
Portland (Maine), 208
Portland (Oregon), 219, 343
Portree, 13
Portsmouth, 47
Portugal, 113, 347
Portuguese East Africa, 271, 278, 349
Portuguese West Africa, 349
Position, determination of, 313
Poti, 342
Potomac, 210, 211
Potosi, 240
Potteries, the, 38
Poyang, L., 161
Prague, 102
Prairies (U.S.A.), 212-216
Pressure, atmospheric, 322
Preston, 22, 30
Pretoria, 280, 345, 349
Prickly pear, 248
Prince Edward Island, 202
Prince's Isle, 266
Providence, 208
ProvinceWellesley, 181
Pruth, R., 105
Puerto Rico, 220, 223
Puget Sound, 219
Punjab, 172, 168
Pygmies, 270, 290
Pyramids, 256
Pyrenees, 70, 121
Pyrenees Mts., 112

Quebec, 199, 343, 350
Queenborough, 46
Queensland, 302-303, 308, 349
Queenstown, 59
Quetta, 153, 342
Quicksilver, 334
Quito, 239, 344, 350

Rabba, 261
Race, 336-337
Radiolarian ooze, 318
Rainfall, distribution of, 324-325
Rainfall, factors affecting, 6-7
Ramsgate, 46
Rand, the, 280
Rangoon, 181, 342
Rattans, 182
Reading, 43
Red Basin, 162
Red clay, 318
Red Indians, 229, 216
Red, R., 202, 214
Red Sea, 272, 319, 320
Redditch, 38
Ree, L., 55
Regina, 203
Reikjavik, 347
Reims, 73, 74
Reunion Isle, 275
Reuss, R., 81
Rhine, R., 81, 82-84, 89-90
Rhodesia, 274, 277, 279, 349
Rhone, R., 76
Rhyl, 33
Ribble, R., 22, 29, 30
Rice, 328
Richmond, 212
Riesen Gebirge, 81, 86
Rift-valleys, 271, 272
Riga, 99
Rio de la Plata, 236
Rio de Janeiro, 236, 350
Rio Janeiro, 344
Rio Tinto, 110
Ripon, 26
Riverina, 299
Riviera, 76, 116
'Roaring Forties,' 324
Rochdale, 29
Rochester, 47, 210
Rockhampton, 302, 303, 346
Rocks, age of, 60
Rocks, Archæan, 316
Rocks, igneous, 60
Rocks, metamorphic, 60
Rocks, sedimentary, 60, 315, 316
Rocks, stratified, 60
Rocky Mts., 203, 217
Rodriguez Isle, 275
Roggeveld Mts., 281, 283
Rome, 116, 340, 347
Rosa, Monte, 79
Rosario, 238
Rosetta, 255, 257
Ross, 14
Rossland, 203
Rosslare, 58
Rostov, 101
Rotherham, 26
Rothesay, 17
Rotterdam, 90
Roubaix, 73
Rouen, 72, 78
Roumania, 107, 347
Royal Canal, 54
Rubber, 235, 330
Rudolf, L., 271
Rugby, 38
Ruhr, R., 84
Russia, 96-101, 347
Russia, Asiatic, 128-138, 348
Ruwenzori, Mt., 273
Rydal Water, L., 27
Rye, 328

Sacramento, 219
Sago, 182, 308
Sahara, the, 249-252
Saigon, 180
St. Alban's Head, 47
St. Andrews, 18
St. Anthony, Falls of, 215
St. Asaph, 32
St. Bride's Bay, 34
St. David's, 32, 34
St. Elias, Mt., 204
St. Etienne, 75
St. Gall, 81
St. George's Channel, 1, 30
St. Gothard, Mont, 81
St. Gothard Pass, 78
St. Gothard Tunnel, 78, 115
St. Helena, 268
St. Helens, 30
St. Helier, 51
St. John, 194, 202, 343
St. Lawrence, R., 199-200
St. Louis (Senegal), 264, 345
St. Louis (U.S.A.), 215, 343, 350
St. Michael's Mount, 50
St. Nazaire, 74
St. Paul, 343
St. Petersburg, 99, 340, 347
St. Thomas (G. of Guinea), 266
St. Thomas (W. Indies), 224
Sakhalin, 133, 165
Salford, 29
Salinity, of ocean, 318
Salisbury, 47
Salisbury Plain, 44, 40
Salisbury, Rhodesia, 279
Salonica, 119
Salt-bush, 296
Salt Desert, 153
Salt Hills, 172
Salt Lake City, 218, 343
Salvador, 222
Salwin, R., 162, 178, 180
Salzach, R., 102, 104
Salzburg, 104
Samara, 100
Samaria, 143
Samarkand, 138
Samoa, 346
Samoan Isles, 309
San Diego, 219, 343
San Domingo, 224
San Francisco, 219, 230, 343
San José, 222
San Salvador, 222
Sandwich Isles, 309
Sanpo, R., 154, 155
Santiago, 242, 344, 350
Santos, 236
São Francisco, R., 235
Saône, R., 75, 78
Saracens, 146, 246, 289
Saratov, 100
Sarawak, 181
Sardines, 50, 74, 108, 333
Sardinia, 119, 108
Sargasso Sea, 320
Sark, 51
Saskatchewan, 203
Saskatchewan, R., 202
Satpura Mts., 175
Sault Ste.Marie Canals, 199
Savannah, 212
Savannah, R., 212
Savannas, 287
Save, R., 107
Saxon Switzerland, 86
Saxony, 86
Scafell, 27
Scandinavia, 93-96
Scarborough, 27, 338
Scheldt, R., 91
Schuylkill, R., 210
Scilly Isles, 50
Scone, 16
Scotland, 9-20, 347
Scrublands, 326
Sea action, 63
Seals, 333
Seasons, 2, 4
Seathwaite, 328
Sebastopol, 101
Sechwan, 162, 163
Sedgmoor, 48
Seine, R., 71, 72, 78
Seistan depression, 154
Sekondi, 266
Selkirk Range, 204
Selsey Bill, 47
Selvas, the, 234
Semitic races, 188, 289
Semmering Pass, 105
Senegal, 264
Senegal, R., 264, 285
Seoul, 165, 348
Serajevo, 106, 347
Servia, 107, 347
Sesame, 264
Setubal, 113
Severn estuary, 37
Severn, R., 36, 31
Severn Tunnel, 37
Seville, 112
Seychelles, 275
Shap Fell, 22, 29
Shan States, 179
Shanghai, 161, 342, 348
Shannon, R., 55, 64
Shansi, 160
Shantung, 160, 161
Shea-tree, 261
Sheep, 332
Sheerness, 46
Sheffield, 26, 328, 347
Sheppey Isle, 46
Sherwood Forest, 39
Shetland Isles, 14
Shields, North and South, 24
Shikoku, 167, 165
Shin, L., 10
Shipka Pass, 107
Shiraz, 152
Shiré, R., 275
Shotts, 245, 286
Shrewsbury, 37, 36
Shropshire, 37
Si-kiang, R., 164
Siam, 180, 178, 348
Siberia, 128-135, 348
Siberian Railway, 100, 132, 133, 134, 157
Sicily, 118, 108
Sidlaw Hills, 15
Sidon, 141
Sierra de Guadarama, 109
Sierra Leone, 265, 345

Sierra Madre, East and West, 221, 225
Sierra Morena, 109, 110
Sierra Nevada, 112, 121
Sierra Nevada (U.S.A.), 218, 219
Sikhs, 172
Silesia, 87
Silk, 332
Silk industry, 76
Silver, 334
Simla, 170, 342
Simon's Town, 284
Simoom, 149
Simplon Pass, 78
Simplon Tunnel, 78, 115
Sinai, peninsula of, 147, 256
Sind, 172
Singan, 160
Singapore, 182, 181, 342
Siut, 255
Skager Rak, 92
Skagway, 204
Skiddaw, 27
Skutari, 120
Skye, 13
Slaney, R., 58
Slate, 32
Slave Coast, 265
Slavonic races, 124, 188
Sleeping sickness, 274
Sligo, 56
Smyrna, 140, 342, 348
Snake, R., 217
Snowdon, 32
Soar, R., 39
Sofia, 107, 347, 340
Sokoto, 262
Sokotra, 148, 258
Solent, 48
Solomon Isles, 308
Solstices, 313
Solway Firth, 20, 21
Solway Moss, 21
Somali, 290
Somaliland, 258
Somerset, 48, 49
Songkoi, R., 179, 178, 180
'Soo' Canals, 199
Sorata, Mt., 239
Sound, the, 91, 92
South Australia, 349
South Australian highlands, 298
South Island (N.Z.), 311
Southampton, 47, 69, 328
Southampton Island, 192
Southampton Water, 47
Southern Alps, 311
Southern Ocean, 319
Southern Pacific Railway, 216, 220
Southern Uplands, 18-20
Southport, 29
Spain, 109-112, 347
Spencer Gulf, 298
Sperrin Mts., 57
Spey, R., 11
Spinifex grass, 296
Spithead, 48
Sponges, 108, 140, 225, 252
Spree, R., 86
Springs, medicinal, 24, 25, 37, 47
Springs, salt, 37
Spurn Head, 27
Srinagar, 170
Staffa, 13
Stafford, 38
Staffordshire, 38
Stalactites, 24, 49
Stalagmites, 24
Stanley Falls, 268
Stanley Pool, 268
Stanovoi Mts., 132
Stassfurt, 86
Steppes, Asiatic, 135, 348
Steppes, the, European, 100
Stettin, 88, 340
Stevenson Road, 275
Stewart Isle, 310
Stirling, 15
Stockholm, 96, 340, 347
Stockport, 29
Stockton, 25
Stoke-upon-Trent, 38
Stonehaven, 15
Stonehouse, 50
Stony Desert, 298
Stormberg Mts., 281
Stornoway, 13
Stour, R. (Kent), 47
Stour, R. (Suffolk), 42
Stourbridge, 38
Straits Settlements, 181
Strangford, L., 58
Stranraer, 20
Strassburg, 82
Strata, 60, 316
Stratford-on-Avon, 38
Strathmore, 15
Stroud, 38
Sturgeon, 100
Stuttgart, 84
Submarine plateau of Britain, 1
Sudan, 259-264
Sudbury, 198
Sudd, 252
Suez, 257
Suez Canal, 257
Suffolk, 42
Sugar, beet, 328
Sugar, cane, 163, 328
Suir, R., 58
Sulaiman Mts., 168, 153
Sumatra, 182, 181
Sunda Strait, 182
Sundarban, 173
Sunderland, 24
Superior, L., 215
Surat, 176
Surrey, 46
Susquehanna, 210
Sussex, 46, 47
Sutlej, R., 172, 170
Swakopmund, 278
Swale, R., 25
Swan, R., 296
Swansea, 34, 33
Swaziland, 282
Sweden, 95-96, 347
Swilly, L., 57
Swindon, 48
Switzerland, 80 - 82, 347
Sydney (Canada), 202, 196
Sydney (N.S.W.), 304, 292, 346, 349
Syr, R., 137
Syria, 141-144, 348

Table Bay, 283
Table Mt., 284, 283
Tablelands, 315
Tabriz, 152
Taff, R., 33, 36
Tafilet, 250
Tagus, R., 109
Tahiti, 346
Tahiti Isle, 292
Tamar, R., 50
Tampico, 221
Tana, L., 258
Tanganyika, L., 274, 268, 271
Tangier, 246
Tapajos, R., 234
Tapti, R., 176
Taranto, Gulf of, 118
Tarim, R., 155
Tarn, R., 75
Tashkent, 137, 342, 348
Tasili Plateau, 249
Tasman, 292
Tasmania, 304, 292, 349
Taunton, 49
Taupo, L., 310
Taurus Mts., 140, 141, 150
Tay Bridge, 16
Tay, Firth of, 16
Tay, L., 12
Tay, R., 11, 16
Tea, 162, 328
Teak, 176, 179, 181
Tees, R., 24, 26
Tegucigalpa, 222
Teheran, 152, 342, 348
Tehuantepec, 222
Teify, R., 33
Tell, the, 245
Tembuland, 282
Teme, R., 36
Temperature, action on rocks, 62
Temperature of ocean, 320
Temperature: factors affecting, 2-5; distribution of, 322; range, 322
Tenby, 34
Teneriffe, 248, 345
Tennessee, R., 214
Terai, 170
Tete, 345
Teutonic languages, 124
Teutonic races, 67
Teviot, R., 20
Tewkesbury, 38
Texas, 214, 216
Thames, Estuary, 2
Thames, R., 43, 64
Thanet, 46
Thar, Desert of, 172
Theiss, R., 105
Thirlmere, L., 27
Thuringian Forest, 81
Thurso, 14
Tian Shan Mts., 136, 150
Tiber, R., 116
Tibesti Plateau, 249
Tibet, 154-155, 348
Ticino, R., 81
Tidal wave, 2
Tides, 1, 2, 47
Tientsin, 160, 348
Tierra del Fuego, 238
Tiflis, 101, 342, 348
Tigris, R., 140, 146
Till, R., 21
Timber, 330
Timbuktu, 261, 252
Time, variations of, 127
Tin, 333
Tipperary, 54
Titicaca, L., 239
Tobacco, 330
Tobol, R., 133
Tobolsk, 133, 342
Tocantins, R., 234, 235
Togoland, 266
Tokay, 105
Tokyo, 168, 342, 348
Toledo, 110
Toledo, Mts. of, 109
Tom, R., 134
Tomsk, 134, 342, 348
Tongking, 180
Toronto, 200, 350
Torquay, 50
Torrens, L., 298
Torres Straits, 292
Toulon, 76
Toulouse, 75
Towns, growth of, 68
Townsville, 302, 303
Towy, R., 33
Trade, entrepôt, 68
Trans-Caspian Railway, 138
Transkei, 282
Transvaal, 280, 349
Trebizond, 141, 342
Trent and Mersey Canal, 30
Trent, R., 38, 39
Trieste, 106, 340
Trincomali, 178, 342
Trinidad, 223, 224
Tripoli, 252, 345, 349
Tromsoe, 340
Trondhjem, 94
Trossachs, 12
Tsetse-fly, 288, 271, 272, 274, 278, 279
Tsin-ling Mts., 158
Tuareg tribes, 250, 289
Tugela, R., 281, 282
Tula, 100
Tunbridge Wells, 47
Tundras, Asiatic, 128
Tundras, European, 98
Tungting, L., 161
Tunis, 247, 349
Tunja, R., 107

Tunny, 108
Turan, plain of, 150
Turin, 113
Turkey, 119-120, 347
Turkey in Asia, 138-146, 348
Turkistan, Eastern, 155, 348
Turkistan, Western, 136, 348
Twat, 250, 252
Tweed, R., 20, 18, 21
Twelve Pins, 56
Tyne, R., 22, 24, 25
Tynemouth, 24
Typhoons, 164, 180, 182
Tyre, 141
Tyrol, 102

Ubangi, 268
Uganda, 273
Ujiji, 274
Ulster, 52
Union and Central Pacific Railway, 220
Union of South Africa, 280, 282, 284
United Kingdom. See British Isles
United Provinces, 173-174, 168
United States, 206-220, 343, 350
Upernavik, 343
Upsala, 96
Ural Mts., 96
Ural, R., 96
Ure, R., 25, 26
Urga, 342, 348
Uruguay, 236-238, 350
Uruguay, R., 232, 236, 238
Usk, R., 31, 33
Uspallata Pass, 238, 240
Usuri, R., 132
Utrecht, 90

Vaal, R., 280
Valdai Hills, 96, 100
Valdivia, 344
Valencia, 112
Valentia Island, 59, 328
Valetta, 108
Valonia, 140
Valparaiso, 240
Van Reenen's Pass, 282
Vancouver, 204
Vancouver Island, 204
Vanilla, 221
Vardar, R., 119
Vasco da Gama, 277
Vegetation, 325-330; Arctic, 325; temperate, 325; tropical, 326; Mediterranean, 109, 326; desert, 326; economic, 326-330; Alpine, 80; African mountains, 273
Veld, 280, 281
Venezuela, 232, 231, 350
Venice, 115, 340
Vera Cruz, 221, 344
Verde, Cape, 259
Verkhoyansk, 342
Verona, 115
Vesuvius, 118
Victoria (Australia), 304, 308, 349
Victoria (Canada), 204
Victoria (Hong Kong), 164
Victoria Falls, 277-278
Victoria, L., 273, 252, 271
Vienna, 104, 340, 347
Vilna, 100
Vincent, Gulf of, 294
Vindhya Mts., 175
Vistula, R., 88, 100
Vivi, 345
Vladivostok, 132, 342
Volcanic action, 118
Volcanoes, 315
Volga, R., 100
Vosges Mts., 70, 77, 82, 121
Vyrnwy, L., 33

Wadi Draa, R., 245
Wadi Halfa, 254, 256
Waikato, R., 310
Wakefield, 26
Wales, 30-34, 347
Walfisch Bay, 278, 345
Wallaroo, 298
Walsall, 38
Wankie, 279
Warsaw, 100, 340
Warwick, 38
Wasatch Mts., 218
Wash, 41, 40
Washington, 211
Water action, 63
Waterford, 58
Waterford Harbour, 58
Wattles, 282
Weald, 47, 45
Wear, R., 24
Webi, R., 258
Wei, R., 158
Welland, R., 40
Wellington, 311, 346, 349
Wells, 49, 246, 285, 298, 302
Welshpool, 33
Wener, L., 96
Wentworth, 346
Weser, R., 87
West Ham, 44
West Indies, 189, 223-225
Western Australia, 296, 349
Westmorland, 27, 28
Weston-super-Mare, 49
Wetter, L., 96
Wexford, 58
Wexford Harbour, 58
Wey, R., 43, 47
Weymouth, 48
Whales, 333
Wharfe, R., 25
Wheat, 42, 65, 202, 326
Whernside, 22
Whitby, 27
White Pass, 204
White Sea, 96
Whitehaven, 28
Wick, 328
Wicklow Mts., 58, 54
Widnes, 30
Wieliczka, 105
Wight, Isle of, 48, 47
Wiltshire, 47
Wimmera, 299, 304
Winchester, 47
Windermere, L., 27
Windhoek, 278
Winds, 322-324
Windsor, 43
Wine, 330
Winnipeg, 203, 343
Winnipeg, L., 202
Wisby, 96
Witham, R., 40
Witwatersrand, 280
Wolds (Lincoln), 40
Wolds (Yorkshire), 27, 40
Wollongong, 303
Wolverhampton, 38
Wool, 332
Woollen industry (Yorkshire), 25
Woolwich, 44
Worcester, 37
Worcestershire, 37, 38
Workington, 28
Worm's Head, 34
Wrekin, 36
Wrexham, 33
Würtemberg, 84
Wye, R., 36, 31, 37

Yak, 154
Yakutsk, 132, 342
Yams, 265, 270, 308
Yangtse, R., 161
Yare, R., 42
Yarkand, 156
Yarmouth, 42, 328
Yarmouth Roads, 42
Yass Canberra, 294
Yellow Sea, 158, 165
Yellowhead Pass, 205
Yellowstone, R., 217
Yemen, 147
Yenisei, R., 132
Yezo, 166, 165
Yokohama, 168
Yonne, R., 71
York, 26, 328
York Cape, 346
York Factory, 343
York, Vale of, 26
Yorkshire, 25-27
Yosemite Valley, 219
Youghal, 58
Yucatan, 221
Yukon, R., 204
Yunnan, 162

Zabern Pass, 77, 83
Zagros Mts., 152, 146, 150
Zambezi R., 277-278, 285
Zanzibar, 271, 345
Zealand, 91
Zinc, 334
Zoological provinces, 330
Zuider Zee, 88, 90
Zulu, 281, 290
Zululand, 282
Zürich, 81
Zürich, L., 81
Zwarte Bergen, 283

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